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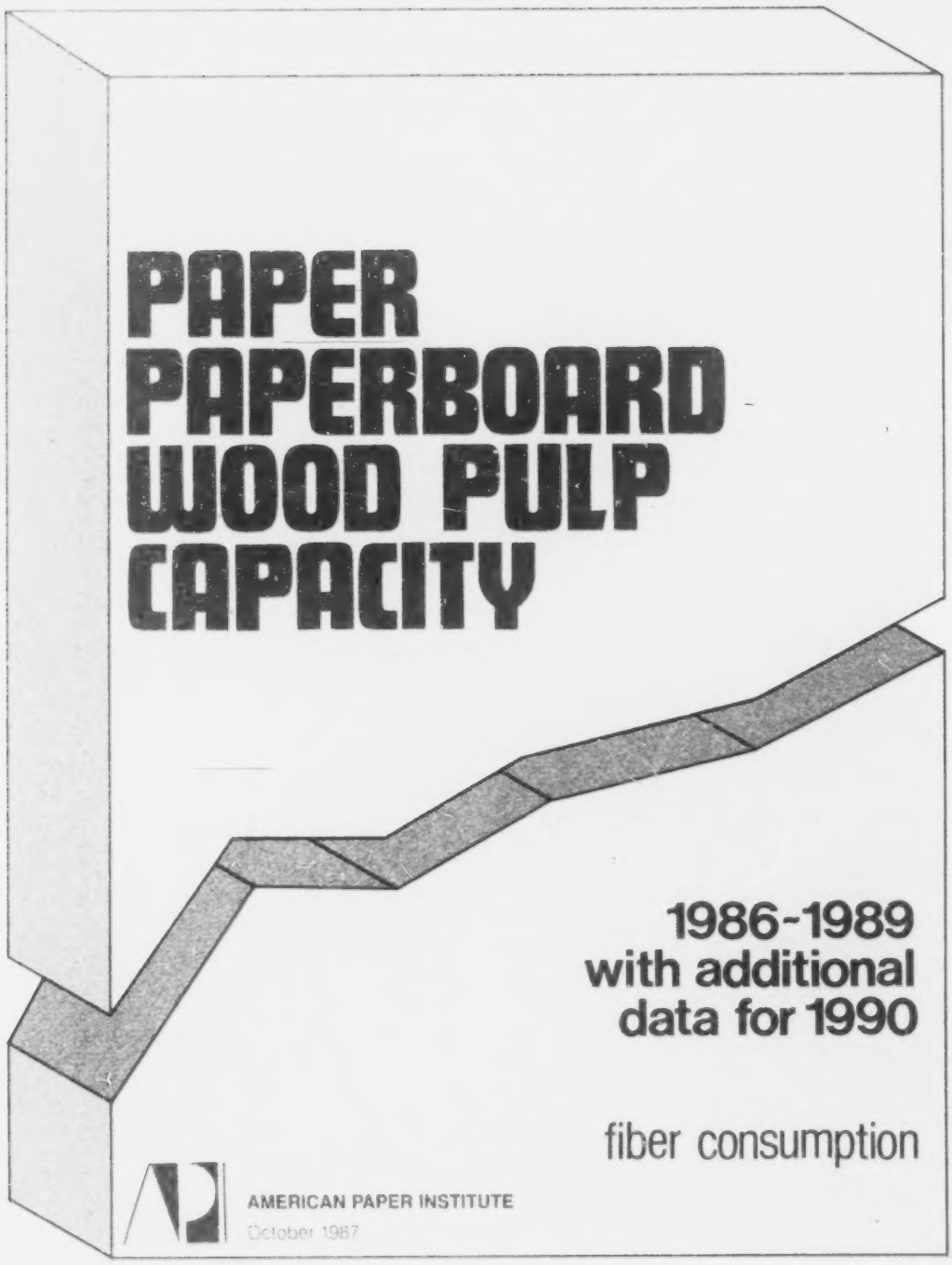

PAPER PAPERBOARD WOOD PULP CAPACITY

1986-1989 with additional data for 1990

fiber consumption

AMERICAN PAPER INSTITUTE
October 1987

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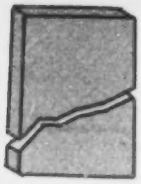

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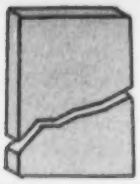


COMMENTARY

Strong demand for paper and paperboard, largely in newsprint, printing and writing papers and unbleached kraft linerboard, has encouraged producers to expand capacity at a higher rate than planned last year. Manufacturing capacity for the production of primary paper and paperboard in U.S. mills should now reach a level of 78,021,000 annual tons in 1987—an increase of 2,244,000 tons over the 1986 total of 75,777,000 tons. This strong 3% increase will represent the highest single-year gain in paper and paperboard capacity in the last fourteen years, both in actual tons and as a growth percent.

Above average increases in capacity are expected to continue into the future, and net additions of 6,083,000 tons, scheduled to be brought into operation over the next three years, should bring capacity for paper and paperboard to 84,104,000 tons in 1990. If these gains are achieved, the productive potential of the industry will grow at an average 2.5% per year, a higher rate of growth than the 2.3% annual average over the prior ten years.

Note: Unless stated otherwise, all references to paper and paperboard and wood pulp exclude construction grades.

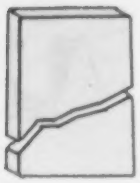
Capacity gains for wood pulp are reported at lower levels than for paper and paperboard. Total wood pulp capacity is expected to reach 60,814,000 tons in 1987, an increase of 1,064,000 tons, or 1.8%, over 1986, while wood pulp available for market sale should increase by 126,000 tons, or 1.6%, to reach 8,165,000 tons in 1987. Future growth in wood pulp capacity is also planned at more modest levels than for paper and paperboard. Net additions over the next three years, now reported at 3,594,000 tons, should bring the industry level to 64,408,000 tons in 1990 at a rate of growth averaging 1.9% annually. Market pulp capacity should increase in this same period at a rate of 1.1% annually to reach 8,444,000 tons in 1990.

Although increases reported for wood pulp capacity, throughout the full five years included in this survey, are consistently lower than those reported for paper and paperboard, they do not appear to indicate a fundamental fiber imbalance. The declining relationship between wood pulp and paper and paperboard is offset in part by plans to increase the use of recyclable paper, which is illustrated in table 6, and also by increased imports. It is also characteristic of the industry that the output of

The American Paper Institute has conducted annual capacity surveys in the primary pulp and paper industry for the last thirty years. Over time, the scope of the surveys has expanded significantly and now includes responses from producers of more than 90% of total U.S. paper, paperboard and wood pulp.

The outline below is intended to clarify definitions and methodology and to assist the user in utilizing the capacity and raw materials data in the survey report.

- Capacity projects included in the survey are firm commitments. Such projects will usually be approved by senior management or boards of directors, have assured financing and, in many instances, will include site acquisition and signed contracts for machines or equipment.
- Published capacities for paper and paperboard represent potential for *primary finished production* before conversion into end products. Capacities for wood pulp are measured at a 10% moisture content. Consumption of pulp wood, recyclable paper and other fiber are "as received at mill".
- The definition of practical maximum capacity assumes normal operating conditions, full demand, adequate supplies of raw materials and available labor. The concept assumes that machines operate on an "all out" basis on their customary grade mix.
- Daily capacities are extrapolated to annual totals based on the maximum number of days each machine can operate in one year. Downtime, scheduled before the start of the year, other than due to lack of orders is excluded from capacity. Unscheduled downtime, is included.
  (Maximum operating days reported on pages 12 through 17 of this survey represent weighted averages of all machines in the industry).
- Capacity changes include the effect of new machine installations, rebuilds, shutdowns, revised operating schedules, grade and basis weight changes or other modifications to existing facilities. Changes also include grade reallocations on "swing" machines which reflect intermediate or long range market strategies and not short-term adjustments to market conditions which are often revised on a monthly basis.
- Capacities of "swing" or multiproduct machines are distributed on the basis of actual grade mix. For example, a swing machine in one year may be capable of producing 100,000 tons of unbleached kraft linerboard, if run exclusively on board, or 80,000 tons of unbleached kraft paper, if run exclusively on paper. If, in fact, the machine produces board for 75% of its operating year and paper for 25%, its capacity would be published as 75,000 tons of linerboard and 20,000 tons of paper. Planned changes in grade allocations (swings) in future years would be calculated in the same way.
- Capacities of dismantled or permanently inactive machines are removed from estimates immediately on shutdown. Capacities of other idled machines are removed after one year unless resumed operation is in prospect.
- Capacities of individual mills are directly related to verified levels of production.
- Edit procedures establish that types and quantities of fiber consumed in each mill are consistent with verified annual production.
- Inconsistencies in reported data are reconciled by direct contacts with company executives.
- Published capacities are grade totals summarized to regional and industry levels. Specific establishment data are not disclosed in the survey unless publicly announced by the respective companies.



COMMENTARY

many wood pulp mills is determined by the needs of on-site papermaking capacity. In such situations, when additional paper capacity is added, wood pulp production can often be increased without major investment or physical construction.

Grade Breakouts

Table 1 highlights planned additions to capacity for the major product grades of paper and paperboard.

- Strong growth is planned for newsprint capacity with 695,000 additional tons expected to come into operation during the next three years. Increases, which include two new greenfield mills and a new machine installation in an existing mill, will end a five-year period in which no new machines were brought on line in the U.S. and capacity increased by only 287,000 tons.
- Capacity for printing and writing papers is expected to increase at a rate averaging 3.2% annually through 1990.
- Modest growth is expected in capacity for tissue papers which will continue to expand at a steady 1.9% per year, somewhat lower than the 2.2% average annual rate for the previous ten-year period.
- Planned additions to unbleached kraft paperboard capacity total almost two million tons—a three year average annual growth rate of 3.3%. With only one new linerboard machine scheduled to come on-stream in 1990, most of this expansion will be achieved from improvements to existing plant and equipment.
- Recycled paperboard capacity should increase at a rate averaging 1% per year through 1990, higher than the 0.6% historical average growth rate for these grades.

TABLE 1:
GROWTH TRENDS IN CAPACITY

Thousands short tons

GRADES	ADDITIONS 1978-1987		ADDITIONS 1988-1990	
	10 YEAR INCREASE	AVERAGE ANNUAL GROWTH	3 YEAR INCREASE	AVERAGE ANNUAL GROWTH
TOTAL ALL GRADES PAPER & PAPERBOARD	**13,690**	**1.9%**	**6,083**	**2.5%**
TOTAL PAPER & PAPERBOARD	**16,017**	**2.3**	**6,083**	**2.5**
TOTAL PAPER	**9,505**	**2.8**	**3,351**	**2.8**
NEWSPRINT	1,872	3.9	695	3.8
PRINTING & WRITING	7,193	4.0	2,225	3.2
PACKAGING & IND. CONV	(650)	(1.1)	110	0.7
TISSUE	1,090	2.2	320	1.9
TOTAL PAPERBOARD	**6,512**	**1.9**	**2,732**	**2.3**
UNBLEACHED KRAFT	4,324	2.6	1,971	3.3
SOLID BLEACHED	655	1.5	191	1.3
SEMICHEMICAL	980	1.9	293	1.7
RECYCLED	553	0.6	277	1.0
CONSTRUCTION GRADES	**(2,327)**	**(7.1)**	—	—
TOTAL ALL GRADES WOOD PULP	**9,866**	**1.8%**	**3,594**	**1.9%**
TOTAL WOOD PULP (excluding pulp for Construction Paper & Board)	**10,904**	**2.0**	**3,594**	**1.9**
DISSOLVING & SPECIAL ALPHA	(266)	(1.7)	14	0.3
SULFITE	(636)	(3.3)	(44)	(0.9)
SULFATE & SODA*	9,865	2.4	2,812	2.0
SEMICHEMICAL	113	0.2	119	0.9
MECHANICAL	1,829	3.5	692	3.5
WOOD PULP FOR CONSTRUCTION PAPER & BOARD	**(1,038)**	**(7.4)**	—	—

*includes screenings

Not adjusted for rounding differences

Sources of New Capacity

A detailed picture of the sources of recent increases in paper and paperboard capacity is illustrated in table 4 which covers a six-year period 1985 through 1990 in which the industry's net gain in capacity is projected at 10,186,000 tons.* This presentation, which expresses capacities as year-end-rates unaffected by operating variables, shows that new machines will provide 44% of all new capacity, with 14% from machines in new greenfield mills and 30% from machines installed in existing mills. Miscellaneous improvements, including machine rebuilds, grade and basis weight changes, "sponge", "creep", and other miscellaneous improvements will account for a full 67% of new capacity growth. Conversions of machines to produce new products and the retirement of uneconomic plant will also affect the anticipated net gain in capacity.

Raw Materials Consumption

The industry's consumption of fibrous raw materials for papermaking, 74,022,000 tons in 1986, is expected to increase by 14% to 84,632,000 tons in 1990 if the industry operates at capacity levels in that year. During this period, the overall pattern of consumption will remain constant at 45% primary fiber and 55% secondary fiber. Within the secondary fiber category, however, table 6 shows that recyclable paper will increase its share of the industry's furnish by almost one full percentage point, while the share of wood pulp manufactured from other secondary material, such as forest residues and waste from manufacturing operations, will decline by a comparable percentage point. To some extent, the share increase for recyclable paper represents producers' plans to utilize more corrugated waste

* Includes construction paper board.

products in the manufacture of unbleached kraft paperboard.

PAPER & PAPERBOARD

Newsprint

In recent years, U.S. newsprint producers have emphasized product quality over capacity growth. Over the last four years, most newsprint machines have been converted to the twin-wire-forming process with a resulting improvement in sheet quality, but capacity has grown by only 167,000 tons or 2.9%. This emphasis is now changing, and this survey reports 695,000 tons of new capacity, mostly in 1990, which should bring the industry to an annual level of 6,636,000 tons in that year, and increase capacity by almost 12% over 1987. Two new greenfield mills and a large new paper machine will provide 80% of the expected new capacity, while improvements to existing machines will account for the remaining 20%.

Growth in capacity in Canada, the world's largest newsprint producer and supplier of more than one half of all newsprint consumed in the U.S., is expected to increase by approximately 400,000 annual tons over the next two years. Increases include 149,000 annual

TABLE 2:
ANNUAL CAPACITIES 1970-1990

Thousands short tons

YEAR	ANNUAL CAPACITY		CAPACITY ADDITIONS DURING YEAR		PERCENT INCREASE	
	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES
1970	53,260	57,195	1,140	1,221	2.2%	2.2%
1971	54,136	58,141	876	946	1.6	1.7
1972	55,873	59,965	1,671	1,824	3.1	3.1
1973	58,164	62,284	2,291	2,319	4.1	3.9
1974	59,527	63,779	1,363	1,495	2.3	2.4
1975	60,140	64,369	613	590	1.0	0.9
1976	61,307	65,673	1,167	1,304	1.9	2.0
1977	62,004	66,459	697	786	1.1	1.2
1978	63,091	67,419	1,087	960	1.8	1.4
1979	64,615	69,033	1,524	1,614	2.4	2.4
1980	66,368	70,716	1,753	1,683	2.7	2.4
1981	68,172	72,255	1,804	1,539	2.7	2.2
1982	70,086	73,118	1,914	863	2.8	1.2
1983	71,126	74,017	1,040	899	1.5	1.2
1984	73,098	75,943	1,972	1,926	2.8	2.6
1985	74,301	76,622	1,203	679	1.6	0.9
1986	75,777	77,921	1,476	1,299	2.0	1.7
1987E	78,021	80,149	2,244	2,228	3.0	2.9
1988E	79,799	81,927	1,778	1,778	2.3	2.2
1989E	81,847	83,975	2,048	2,048	2.6	2.5
1990E	84,104	86,232	2,257	2,257	2.8	2.7

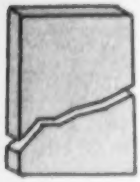
E—Estimate

TABLE 3:
COMPARISON OF CAPACITY ESTIMATES FOR TOTAL PAPER & PAPERBOARD

Thousands short tons

SURVEY PUBLISHED IN:	ESTIMATES							
	1982	1983	1984	1985	1986	1987	1988	1989
1981	70,355	71,833	72,964					
1982	70,197	71,155	72,455	73,806				
1983	70,086*	70,814	71,965	73,054	74,084			
1984		71,126*	72,749	73,700	74,973	76,317		
1985			73,098*	74,304	75,803	77,708	78,768	
1986				74,301*	75,618	77,383	78,777	79,836
1987					75,777*	78,021	79,799	81,847
WIDEST DEVIATION FROM ACTUAL	0.4%	1.0%	1.6%	1.7%	2.3%			
WIDEST RANGE						2.2%	1.3%	2.5%

*Actual



COMMENTARY

TABLE 4:
GROWTH IN YEAR END
PAPER AND PAPERBOARD CAPACITY

SOURCE OF CAPACITY	1985-1990 SIX YEAR INCREASE	
	Millions of Short Tons	Percent
Planned capacity additions—Total	10.2	100%
Of Which:		
Greenfield mills	1.4	14%
New machines in existing mills	3.1	30%
Rebuilds and other improvements	6.8	67%
Machine conversions	1.4	14%
Mills and machines shut down	(2.5)	(25%)

Includes construction paper and board.

TABLE 5:
RELATIONSHIP—RAW MATERIALS/END PRODUCTS

DESCRIPTION	RELATIONSHIP				
	ACTUAL	ESTIMATES			
	1986	1987	1988	1989	1990
Planned wood pulp capacity as a percent of paper and paperboard capacity	77.9%	77.0%	76.6%	76.2%	75.7%
Planned wood pulp capacity plus planned consumption of recyclable paper as a percent of paper and paperboard capacity	101.1%	101.0%	101.0%	101.2%	100.7%

Includes construction paper and board.

tons reported by the Canadian Pulp and Paper Association in May 1987, and a recently approved expansion in British Columbia scheduled for 1989.

Printing and Writing Papers

Two new paper machines scheduled for start-up in 1988 and 1989, together with other major expansion projects, will increase capacity for uncoated free sheet papers by more than one million tons, from 11,520,000 annual tons in 1987 to 12,543,000 annual tons in 1990. These additions, which will expand the capacity base at a 2.9% annual rate, fall short of the historical 4.4% average rate of increase over the last ten years.

As a result of capacity swings to other printing and writing grades and delayed and reduced expansion plans, capacity for coated groundwood paper at 4,132,000 tons in 1987 is now estimated at 192,000 tons below the level anticipated last year. This reduced rate of expansion continues into the future and a new paper machine reported last year for start-up in 1988 is now postponed until the following year. Overall however, capacity growth for these papers is still quite strong and capacity is now estimated to increase by 9% in the next three years, to reach 4,509,000 annual tons in 1990.

In a reverse trend, capacity estimates for coated free sheet papers, at 3,767,000 tons in 1989, exceed last year's estimates for that year by 294,000 tons, and additional increases expected in 1990 should bring total capacity to 3,880,000 tons in that year. These planned increases in capacity include two new paper machines, one of which will replace three smaller machines, as well as other expansions projects, and capacity swings from other grades. If realized, they will add new capacity at a remarkable rate averaging 6.2% per year over the three years 1988-1990.

Unbleached Kraft Packaging Papers

Producers of unbleached kraft packaging papers continue to face the difficult market conditions which, in the last four years, have made it necessary to reduce capacity by machine shutdowns or conversions to other grades by more than 500,000 annual tons. Further reductions of 209,000 annual tons are reported for 1987, mostly from the removal of capacity for a machine converted from the production of kraft packaging to printing and writing papers. In the remaining three years covered by this survey capacity is expected to remain in a relatively stable condition and miscellaneous increases totalling 68,000 tons should bring the industry level to 3,438,000 tons in 1990.

Tissue Papers

From an annual level of 5,635,000 tons in 1987, capacity for tissue papers should expand at a rate averaging 1.9% annually over the next three years to reach a total of 5,955,000 annual tons in 1990. This steady rate of increase includes tonnage from the start-up of two new paper machines and is consistent with capacity estimates reported in our survey last year.

Unbleached Kraft Paperboard

Growth in capacity for unbleached kraft paperboard is expected to maintain a strong 3.3% annual rate of increase over the three-year period 1988-1990, a markedly higher rate than the 2.6% annual average over the previous ten years. From a total of 19,117,000 annual tons in 1987, capacity should reach 20,193,000 tons in 1989, more than 800,000 tons ahead of producers' estimates for 1989 last year, and then increase to 21,088,000 annual tons in 1990. Major expansions include a new 350,000 annual ton kraft linerboard machine and a 400,000 annual ton folding boxboard expansion—probably the largest-ever single expansion project for folding boxboard. Supplementing these major new facilities, producers report machine rebuilds and other improvement projects, including fourteen individual linerboard expansions of 50,000 annual tons or

greater, which contribute to the higher than average growth in capacity for these products.

Solid Bleached Paperboard

The last paper machine dedicated to solid bleached paperboard, which is used mostly for food packaging and beverage containers, was brought into operation in 1986 and no additional machines are scheduled in the upcoming three years. Capacity gains from improvements and modernizations, including the reinstatement of an expansion project that had been postponed in last year's survey, will yield a net increase in capacity of 191,000 annual tons. These improvements will bring total capacity for bleached paperboard to 4,866,000 annual tons in 1990.

Recycled Paperboard

Despite the removal of 100,000 tons of annual capacity in 1986 for an idle recycled linerboard mill, capacity for recycled paperboard increased by 457,000 tons, or 5.2%, between 1985 and 1987. Further planned expansions, mostly in the corrugating medium, linerboard and folding grades, should provide additional increases in capacity of 277,000 tons annually by 1990. The basis for these increases includes the conversion of two paper machines which previously produced other products to the manufacture of recycled paperboard, as well as more than twenty separate machine rebuilds and capacity enhancements spread across the industry.

WOOD PULP

Dissolving Pulps

Capacities for dissolving and special alpha pulps are reported to remain unchanged at 1,400,000 tons annually for the full five-year period covered by this survey. Since most dissolving pulp is used in the manufacture of rayon, viscose, acetate or other nonpaper products, decisions affecting capacity of this pulp grade are not directly related to conditions within the paper industry.

Sulfate and Soda Pulps

Expansion plans for bleached sulfate and soda pulps, largely used in the manufacture of printing and writing and tissue papers, and in food packaging products, should yield 1,476,000 tons of new capacity in the 1988-1990 period. Expansion for unbleached sulfate and soda pulps, used in the manufacture of linerboard, folding boxboard, and kraft packaging paper, should yield an additional 1,335,000 tons of capacity in the same three-year period. These increases reflect average annual growth rates of 1.9% and 2.0%, respectively.

Market Pulp

Capacity allocated to the production of chemical paper grade pulp for market sale should reach 6,776,000 annual tons in 1987—more than 400,000 tons higher than producers' estimates in last year's survey. These increases, influenced by strong market conditions, are expected to continue and additional gains are reported which would add a further 264,000 annual tons, or 3.9%, to this base in the upcoming three years. While these increases do not match the rates of growth for paper and paperboard, and do not include major new mills, they are considerably higher than those anticipated in last year's survey. Global market conditions for these pulps have been quite strong and producers' responses have included new expansion projects at existing plants, postponing the conversion of an existing pulp facility to produce paper, and rebuilding an idle paper machine to produce market pulp.

TABLE 6:
FIBER SOURCES FOR PAPER & PAPERBOARD MANUFACTURE

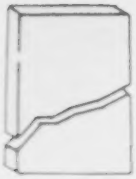
Thousands short tons

GRADES	1986 ANNUAL TONS	1986 PERCENT	1987 ANNUAL TONS	1988 ANNUAL TONS	1989 ANNUAL TONS	1990 ANNUAL TONS	1990 PERCENT
TOTAL CONSUMPTION	**74,022**	**100.0%**	**77,616**	**79,836**	**82,709**	**84,632**	**100.0%**
PRIMARY FIBERS	**33,238**	**44.9**	**35,086**	**35,849**	**36,995**	**38,030**	**44.9**
WOOD PULP	33,238	44.9	35,086	35,849	36,995	38,030	44.9
SECONDARY FIBERS	**40,784**	**55.1**	**42,530**	**43,987**	**45,714**	**46,602**	**55.1**
WOOD PULP	22,343	30.2	23,005	23,601	24,357	24,724	29.3
RECYCLABLE PAPER*	18,128	24.5	19,206	20,050	21,000	21,518	25.4
OTHER	313	0.4	319	336	357	360	0.4

Note: Consumption for 1988–1990 assumes capacity levels of production.

**Includes the following tonnage consumed in the manufacture of molded pulp products: 1986, 193,000 tons; 1987, 204,000 tons; 1988–1990, 222,000 tons.*

Richard E. Storat
Vice President
October, 1987



PAPER & PAPERBOARD

capacity summary annual

Practical Maximum Basis
Thousands short tons

GRADES	1986	1987	1988	1989	1990*
TOTAL ALL GRADES	77,921	80,149	81,927	83,975	86,232
Total Paper & Paperboard	**75,777**	**78,021**	**79,799**	**81,847**	**84,104**
Total Paper	**38,014**	**39,336**	**40,278**	**41,437**	**42,687**
NEWSPRINT	5,804	5,941	6,013	6,099	6,636
PRINTING WRITING & RELATED	20,980	22,168	22,832	23,727	24,393
Uncoated Groundwood	1,685	1,756	1,865	1,882	1,917
Coated Groundwood	3,799	4,132	4,251	4,344	4,509
Coated Free Sheet	2,944	3,237	3,393	3,767	3,880
Uncoated Free Sheet	11,023	11,520	11,780	12,190	12,543
Cotton Fiber	192	196	197	198	199
Thin Papers	312	309	309	309	309
Solid Bleached Bristols	1,025	1,018	1,038	1,037	1,036
PACKAGING & IND. CONV.	5,758	5,592	5,662	5,687	5,702
Unbleached Kraft	3,579	3,370	3,416	3,430	3,438
Bleached Packaging & Ind. Conv.	538	531	530	530	530
Specialty Packaging	554	570	570	569	568
Special Industrial	1,086	1,122	1,147	1,158	1,167
TISSUE	5,472	5,635	5,771	5,924	5,955
Total Paperboard	**37,763**	**38,685**	**39,521**	**40,410**	**41,417**
UNBLEACHED KRAFT	18,622	19,117	19,596	20,193	21,088
of which Kraft Linerboard	17,175	17,704	18,071	18,633	19,195
SOLID BLEACHED	4,576	4,675	4,768	4,854	4,866
SEMICHEMICAL	5,557	5,641	5,711	5,863	5,934
RECYCLED	9,008	9,252	9,446	9,500	9,529
Total Construction Paper & Board and Other	**2,143**	**2,128**	**2,128**	**2,128**	**2,128**

*Capacity additions presented here for 1990 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

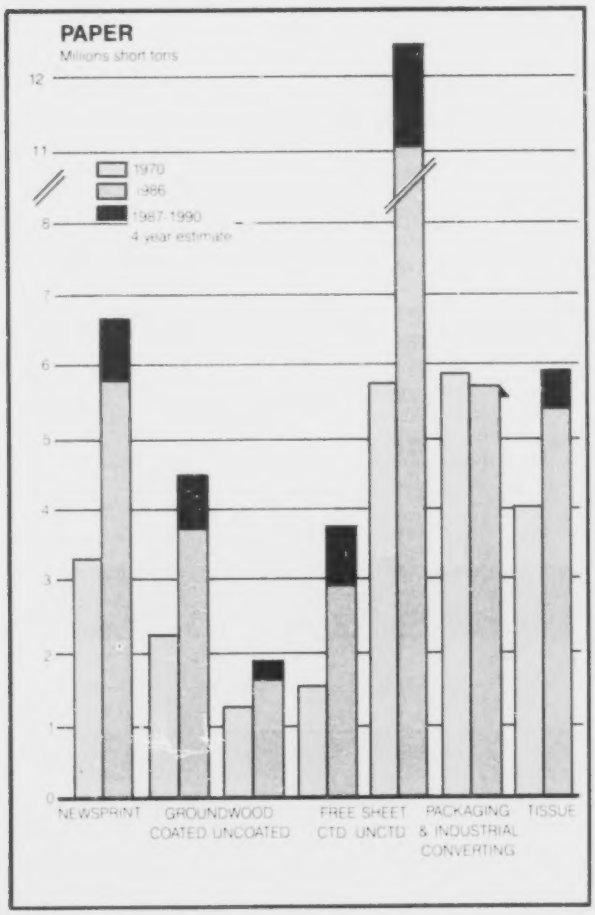
Data not adjusted for rounding differences.

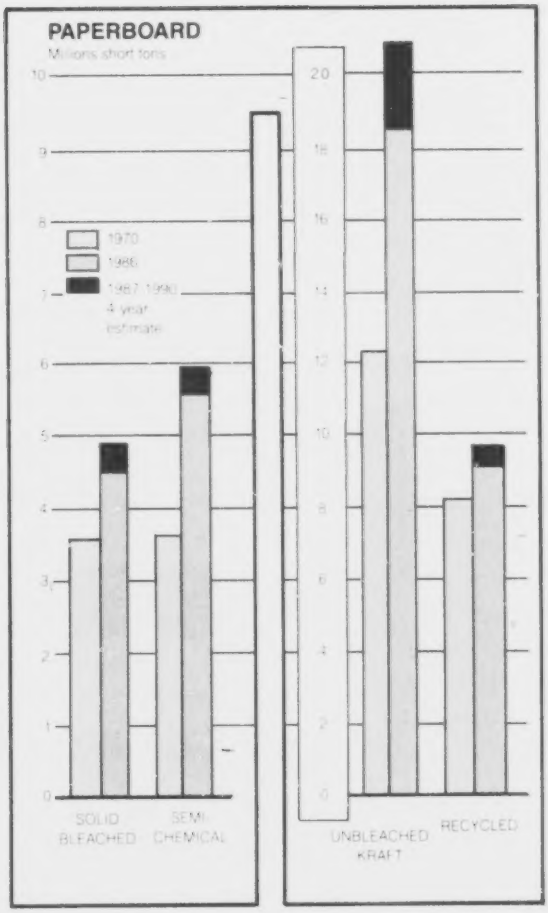
capacity reductions

paper and paperboard mills and machines shut down

Grades	1971-1975 Number of Machines	1971-1975 Number of Complete Mills	1971-1975 Annual Capacity	1976-1980 Number of Machines	1976-1980 Number of Complete Mills	1976-1980 Annual Capacity
TOTAL	**135**	**39**	**2,482**	**163**	**53**	**3,990**
Paper						
Newsprint	—	—	—	3	1	231
Printing, Writing & Related	51	8	803	32	5	550
Pkg. & Ind. Conv.	35	8	290	32	7	395
Tissue	6	4	52	25	8	246
Paperboard						
Unbleached Kraft	2	—	128	2	1	400
Solid Bleached	1	—	33	2	1	162
Semichemical	3	1	123	4	1	178
Recycled	29	14	872	35	12	1,295
Construction Paper & Board & Other	8	4	181	28	17	533

capacity/annual growth comparison



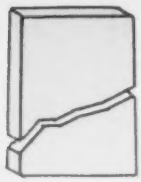


Thousands short tons

Grades	1981-1984* Number of Machines	1981-1984* Number of Complete Mills	1981-1984* Annual Capacity	1985-1990* Number of Machines	1985-1990* Number of Complete Mills	1985-1990* Annual Capacity
TOTAL	**186**	**80**	**4,972**	**62**	**8**	**2,505**
Paper						
Newsprint	3	—	206	2	—	154
Printing, Writing & Related	23	2	517	28	2	583
Pkg. & Ind. Conv.	22	6	360	14	1	758
Tissue	26	11	264	6	2	57
Paperboard						
Unbleached Kraft	4	—	562	3	—	565
Solid Bleached	—	—	—	1	—	95
Semichemical	6	1	463	2	1	190
Recycled	18	12	644	2	—	30
Construction Paper & Board & Other	84	48	1,956	4	2	73

Shutdowns represent machines and mills reported to the API as permanent or indefinite closures and have been removed from capacity totals. Not all of the facilities have been dismantled and some portion of their productive capacity could be restored.

*Includes machines converted to produce other grades.



WOOD PULP

Practical Maximum Basis
Thousands short tons

GRADES	1986	1987	1988	1989	1990*
TOTAL ALL GRADES WOOD PULP	60,686	61,715	62,730	63,951	65,309
Total Wood Pulp (exc. pulp for Construction Paper & Board)	**59,750**	**60,814**	**61,829**	**63,050**	**64,408**
DISSOLVING	1,399	1,382	1,395	1,395	1,396
CHEMICAL PAPER GRADES	47,655	48,467	49,310	50,312	51,236
SULFITE PAPER GRADES	1,703	1,616	1,572	1,572	1,572
SULFATE & SODA PAPER GRADES	45,952	46,851	47,737	48,740	49,663
Bleached & Semibleached Softwood	13,169	13,461	13,636	13,866	13,987
Bleached & Semibleached Hardwood	11,402	11,817	12,059	12,543	12,767
Unbleached	21,381	21,574	22,042	22,331	22,909
SEMICHEMICAL	4,631	4,627	4,639	4,712	4,746
MECHANICAL	6,058	6,331	6,478	6,623	7,023
SCREENINGS	7	7	7	7	7
Total Wood Pulp for Construction Paper & Board†	**936**	**901**	**901**	**901**	**901**

capacity summary annual

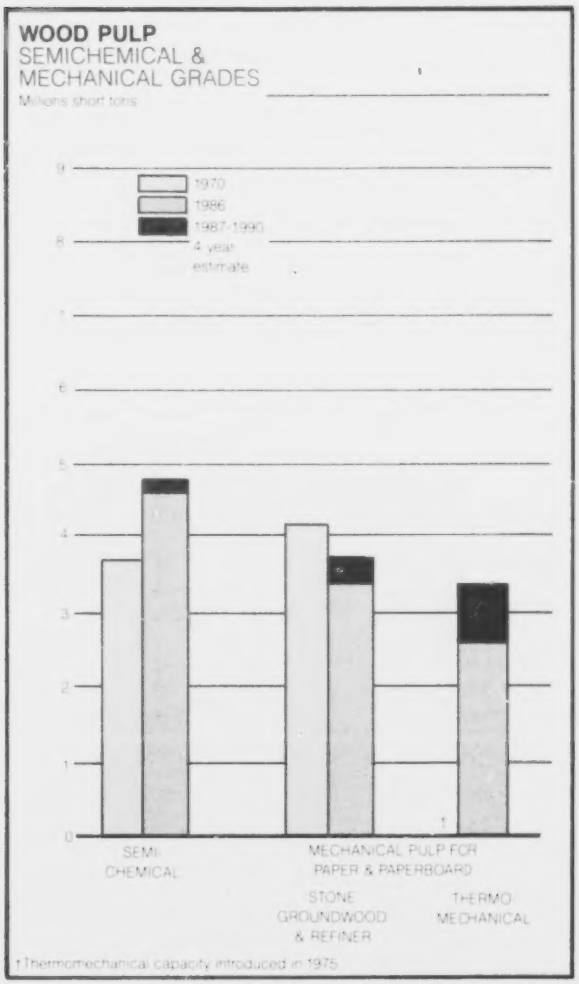
TOTAL MACHINE DRIED WOOD PULP	10,409	10,504	10,676	10,692	10,685
DISSOLVING	1,399	1,382	1,395	1,395	1,396
CHEMICAL PAPER GRADES	8,891	9,003	9,161	9,177	9,170
SULFITE PAPER GRADES	404	408	408	408	408
SULFATE & SODA PAPER GRADES	8,488	8,594	8,753	8,769	8,762
Bleached & Semibleached Softwood	5,122	5,180	5,297	5,315	5,336
Bleached & Semibleached Hardwood	3,220	3,229	3,269	3,266	3,238
Unbleached	145	185	188	188	188
ALL OTHER	119	119	119	119	119

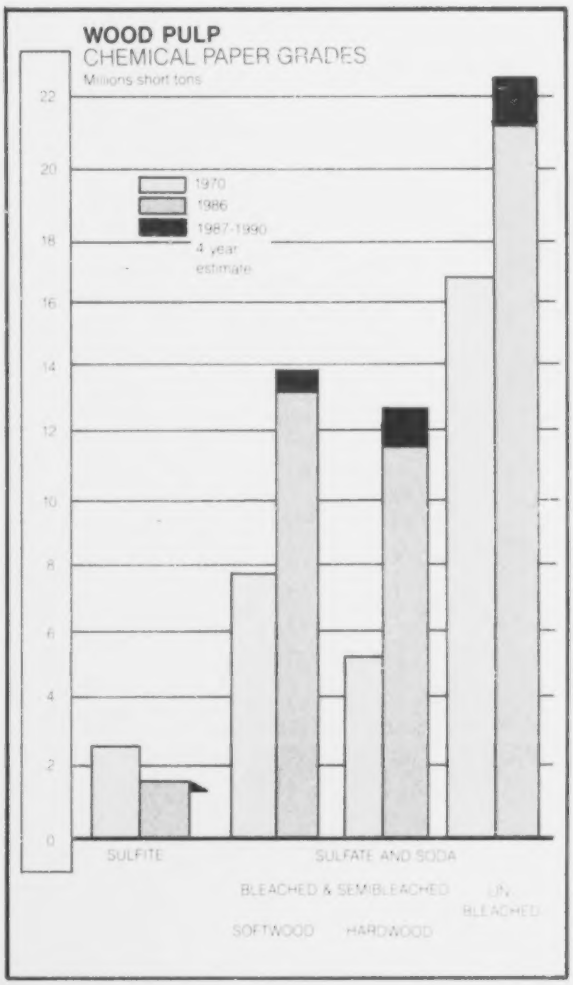
*Capacity additions presented here for 1990 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

capacity/annual growth comparison





MARKET WOOD PULP

capacity summary annual

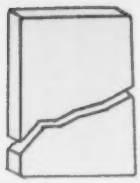
Practical Maximum Basis
Thousands short tons

GRADES	1986	1987	1988	1989	1990*
TOTAL MARKET WOOD PULP	**8,039**	**8,165**	**8,400**	**8,454**	**8,444**
DISSOLVING	1,395	1,376	1,390	1,391	1,391
CHEMICAL PAPER GRADES	6,630	6,776	6,996	7,049	7,040
SULFITE PAPER GRADES	287	285	285	285	285
SULFATE & SODA PAPER GRADES	6,343	6,491	6,711	6,764	6,755
Bleached & Semibleached Softwood	3,746	3,743	3,842	3,869	3,890
Bleached & Semibleached Hardwood	2,452	2,563	2,681	2,708	2,677
Unbleached	145	185	188	188	188
ALL OTHER	14	14	14	14	14

Based on information provided by producers. Reflects diversion of drying capacity to and from own use, installation of new equipment and retirement of existing equipment.

**Capacity additions presented here for 1990 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

Totals not adjusted for rounding differences.



PAPER BY GRADE

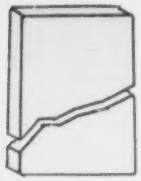
capacity/annual • year end • daily

	ALL GRADES PAPER & PAPER-BOARD Total	PAPER & PAPER-BOARD Total		Practical Maximum Basis Thousands short tons	PAPER Total	NEWS-PRINT Total	Total	Uncoated Ground-wood
ANNUAL CAPACITY 1986-1990	77,921	75,777	1986	Annual Capacity	38,014	5,804	20,980	1,685
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	770	770		New Machines	724	—	627	5
	1,458	1,473		Net Improvements	598	137	561	66
	80,149	**78,021**	**1987**	**Annual Capacity**	**39,336**	**5,941**	**22,168**	**1,756**
	383	383		New Machines	383	—	318	146
	1,395	1,395		Net Improvements	559	72	346	(37)
	81,927	**79,799**	**1988**	**Annual Capacity**	**40,278**	**6,013**	**22,832**	**1,865**
	750	750		New Machines	750	46	600	28
	1,297	1,297		Net Improvements	409	40	295	(11)
	83,975	**81,847**	**1989**	**Annual Capacity**	**41,437**	**6,099**	**23,727**	**1,882**
	1,365	1,365		New Machines	926	512	414	—
	892	892		Net Improvements	323	25	252	35
	86,232	**84,104**	**1990***	**Annual Capacity**	**42,687**	**6,636**	**24,393**	**1,917**
YEAR END CAPACITY 1986-1990	78,548	76,420	**1986**	**Year End Capacity**	**38,249**	**5,812**	**21,315**	**1,676**
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	479	479		New Machines	479	—	388	74
	2,004	2,004		Net Improvements	1,021	143	766	86
	81,030	**78,902**	**1987**	**Year End Capacity**	**39,749**	**5,955**	**22,469**	**1,836**
	531	531		New Machines	531	—	385	105
	1,182	1,162		Net Improvements	429	75	235	(60)
	82,742	**80,614**	**1988**	**Year End Capacity**	**40,709**	**6,029**	**23,089**	**1,880**
	1,067	1,067		New Machines	1,067	302	765	—
	1,219	1,219		Net Improvements	413	27	344	36
	85,029	**82,901**	**1989**	**Year End Capacity**	**42,189**	**6,358**	**24,199**	**1,917**
	1,195	1,195		New Machines	432	306	126	—
	665	665		Net Improvements	297	24	220	17
	86,889	**84,761**	**1990***	**Year End Capacity**	**42,918**	**6,688**	**24,544**	**1,933**
YEAR END DAILY RATE 1986-1990	352	354	**1986**	Available Days	355	360	354	350
	223.04	216.22		Daily Rate	107.86	16.16	60.13	4.79
	353	354	**1987**	Available Days	356	360	356	359
	229.72	**222.90**		**Daily Rate**	**111.81**	**16.54**	**63.17**	**5.11**
	353	354	**1988**	Available Days	356	360	356	359
	234.53	**227.71**		**Daily Rate**	**114.49**	**16.74**	**64.89**	**5.23**
	353	354	**1989**	Available Days	356	360	356	359
	240.96	**234.14**		**Daily Rate**	**118.65**	**17.66**	**68.01**	**5.33**
	353	355	**1990***	Available Days	356	360	356	359
	246.20	**239.38**		**Daily Rate**	**120.69**	**18.60**	**68.97**	**5.38**

*Capacity additions presented here for 1990 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

PRINTING, WRITING & RELATED							PACKAGING & INDUSTRIAL CONVERTING				TISSUE
Coated Ground-wood	Coated Free Sheet	Uncoated Free Sheet	Cotton Fiber	Thin Papers	Solid Bleached Bristols	Total	Un-bleached Kraft	Bleached Packaging & Industrial Converting	Specialty Packaging	Special Industrial	Total
3,799	2,944	11,023	192	312	1,025	5,758	3,579	538	554	1,086	5,472
177	192	251	3	—	—	—	—	—	—	—	97
157	101	246	2	(4)	(7)	(166)	(210)	(7)	16	35	66
4,132	**3,237**	**11,520**	**196**	**309**	**1,018**	**5,592**	**3,370**	**531**	**570**	**1,122**	**5,635**
31	119	22	—	—	—	—	—	—	—	—	65
87	37	239	—	—	20	70	46	(1)	(1)	26	71
4,251	**3,393**	**11,780**	**197**	**309**	**1,038**	**5,662**	**3,416**	**530**	**570**	**1,147**	**5,771**
4	343	225	—	—	—	—	—	—	—	—	104
89	32	185	1	—	(1)	24	14	—	(1)	11	49
4,344	**3,767**	**12,190**	**198**	**309**	**1,037**	**5,687**	**3,430**	**530**	**569**	**1,158**	**5,924**
171	57	187	—	—	—	—	—	—	—	—	—
(6)	56	166	1	—	(1)	16	8	—	(1)	9	31
4,509	**3,880**	**12,543**	**199**	**309**	**1,036**	**5,702**	**3,438**	**530**	**568**	**1,167**	**5,955**
3,843	**3,113**	**11,178**	**197**	**307**	**1,001**	**5,596**	**3,400**	**533**	**569**	**1,093**	**5,526**
118	115	81	—	—	—	—	—	—	—	—	91
220	66	356	—	2	37	32	(7)	(4)	—	43	80
4,181	**3,294**	**11,615**	**196**	**309**	**1,038**	**5,628**	**3,393**	**530**	**569**	**1,137**	**5,697**
—	281	—	—	—	—	—	—	—	—	—	145
115	(41)	221	1	—	—	48	31	—	—	17	71
4,296	**3,533**	**11,836**	**197**	**309**	**1,038**	**5,676**	**3,424**	**530**	**569**	**1,153**	**5,914**
175	207	383	—	—	—	—	—	—	—	—	—
23	93	190	2	—	—	22	13	—	(1)	9	21
4,494	**3,834**	**12,408**	**199**	**309**	**1,037**	**5,698**	**3,438**	**530**	**568**	**1,162**	**5,935**
26	—	99	—	—	—	—	—	—	—	—	—
16	50	139	1	—	(2)	8	—	—	(1)	9	45
4,536	**3,884**	**12,647**	**200**	**309**	**1,036**	**5,706**	**3,438**	**530**	**567**	**1,171**	**5,980**
354	357	356	318	341	356	352	356	355	353	338	353
10.84	8.73	31.44	.62	.90	2.81	15.91	9.56	1.50	1.61	3.24	15.66
356	357	356	318	342	357	352	356	355	355	338	354
11.74	**9.24**	**32.65**	**.62**	**.90**	**2.91**	**16.00**	**9.54**	**1.49**	**1.60**	**3.36**	**16.12**
356	357	356	318	342	357	352	356	355	355	338	354
12.06	**9.90**	**33.26**	**.62**	**.90**	**2.90**	**16.13**	**9.63**	**1.49**	**1.60**	**3.41**	**16.72**
356	356	356	318	342	357	352	356	355	355	338	354
12.63	**10.76**	**34.86**	**.63**	**.90**	**2.90**	**16.19**	**9.67**	**1.49**	**1.60**	**3.43**	**16.78**
356	356	356	318	342	357	352	356	355	355	338	354
12.75	**10.90**	**35.52**	**.63**	**.90**	**2.90**	**16.22**	**9.67**	**1.49**	**1.60**	**3.46**	**16.91**

Totals not adjusted for rounding differences



PAPERBOARD BY GRADE

capacity/annual • year end • daily

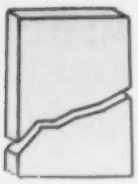
			PAPER-BOARD	UNBLEACHED KRAFT PAPERBOARD				SOLID BLEACHED PACKAGING PAPERBOARD				
		Practical Maximum Basis										
		Thousands short tons	**Total**	**Total**	**Liner-board**	**Folding**	**Other**	**Total**	**Liner-board**	**Folding**	**Milk Carton & Food Service**	**Other**
ANNUAL CAPACITY 1986-1990	1986	Annual Capacity	37,763	18,622	17,175	946	501	4,576	135	2,341	1,926	175
		New Machines	46	—	—	—	—	30	—	30	—	—
		Net Improvements	875	495	530	37	(71)	69	3	35	26	5
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	**1987**	**Annual Capacity**	**38,685**	**19,117**	**17,704**	**983**	**430**	**4,675**	**137**	**2,406**	**1,952**	**180**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	836	479	366	113	—	93	1	75	17	—
	1988	**Annual Capacity**	**39,521**	**19,596**	**18,071**	**1,096**	**430**	**4,768**	**138**	**2,481**	**1,969**	**180**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	888	597	563	34	—	86	4	63	19	—
	1989	**Annual Capacity**	**40,410**	**20,193**	**18,633**	**1,130**	**430**	**4,854**	**143**	**2,544**	**1,988**	**180**
		New Machines	439	439	135	304	—	—	—	—	—	—
		Net Improvements	569	456	427	29	—	12	4	(1)	10	—
	1990*	**Annual Capacity**	**41,417**	**21,088**	**19,195**	**1,463**	**430**	**4,866**	**146**	**2,543**	**1,998**	**180**
YEAR END CAPACITY 1986-1990	**1986**	**Year End Capacity**	38,170	**18,827**	**17,441**	**957**	**429**	**4,659**	**138**	**2,378**	**1,963**	**180**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	983	625	494	130	1	41	—	53	(12)	—
Year End Capacity is calculated by multipying Daily Rate by number of Available Days	**1987**	**Year End Capacity**	**39,153**	**19,453**	**17,936**	**1,087**	**430**	**4,700**	**138**	**2,431**	**1,951**	**180**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	753	376	358	18	—	144	1	114	28	—
	1988	**Year End Capacity**	**39,906**	**19,829**	**18,294**	**1,105**	**430**	**4,844**	**139**	**2,545**	**1,980**	**180**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	806	609	565	44	—	20	7	—	13	—
	1989	**Year End Capacity**	**40,712**	**20,438**	**18,859**	**1,149**	**430**	**4,864**	**146**	**2,545**	**1,993**	**180**
		New Machines	763	763	349	414	—	—	—	—	—	—
		Net Improvements	368	302	269	33	—	4	—	(1)	5	—
	1990*	**Year End Capacity**	**41,843**	**21,503**	**19,477**	**1,595**	**430**	**4,868**	**146**	**2,544**	**1,998**	**180**
YEAR END DAILY RATE 1986-1990	1986	Available Days	352	355	355	353	357	359	350	359	359	359
		Daily Rate	108.37	53.04	49.13	2.71	1.20	12.98	.39	6.62	5.47	.50
	1987	Available Days	352	355	355	353	358	359	349	360	358	359
		Daily Rate	**111.09**	**54.75**	**50.47**	**3.08**	**1.20**	**13.10**	**.39**	**6.76**	**5.45**	**.50**
	1988	Available Days	352	355	355	353	358	359	349	360	358	359
		Daily Rate	**113.22**	**55.82**	**51.48**	**3.13**	**1.20**	**13.50**	**.40**	**7.07**	**5.53**	**.50**
	1989	Available Days	353	355	355	353	358	359	349	360	358	359
		Daily Rate	**115.49**	**57.53**	**53.07**	**3.26**	**1.20**	**13.56**	**.42**	**7.07**	**5.56**	**.50**
	1990*	Available Days	353	355	355	354	358	359	349	360	358	359
		Daily Rate	**118.68**	**60.54**	**54.83**	**4.50**	**1.20**	**13.57**	**.42**	**7.07**	**5.58**	**.50**

*Capacity additions presented here for 1990 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

CONSTRUCTION PAPER & BOARD BY GRADE

SEMI-CHEMICAL PAPERBOARD	RECYCLED PAPE								CONSTRUCTION PAPER & BOARD & WET MACHINE BOARD			
Total	Total	Linerboard	Corrugating Medium	Containe Chi			Gypsum Wall d	Other	Total	Construction Paper	Wet Machine Board	Insulating Board
5,557	9,008	467	1,580					2,637	2,143	834	154	1,156
—	17	17	—	—	—	—	—	—	—	—	—	—
84	227	56	86	6	9	(1)	36	35	(15)	(8)	(1)	(6)
5,641	**9,252**	**540**	**1,666**	**48**	**2,671**	**270**	**1,385**	**2,672**	**2,128**	**826**	**152**	**1,150**
—	—	—	—	—	—	—	—	—	—	—	—	—
70	194	47	86	1	25	1	9	24	—	—	—	—
5,711	**9,446**	**587**	**1,752**	**50**	**2,696**	**271**	**1,394**	**2,696**	**2,128**	**826**	**152**	**1,150**
—	—	—	—	—	—	—	—	—	—	—	—	—
152	54	9	13	—	10	1	8	12	—	—	—	—
5,863	**9,500**	**596**	**1,764**	**50**	**2,707**	**272**	**1,402**	**2,709**	**2,128**	**826**	**152**	**1,150**
—	—	—	—	—	—	—	—	—	—	—	—	—
71	29	—	10	—	7	1	5	7	—	—	—	—
5,934	**9,529**	**596**	**1,774**	**50**	**2,713**	**273**	**1,406**	**2,716**	**2,128**	**826**	**152**	**1,150**
5,618	**9,065**	**488**	**1,588**	**48**	**2,648**	**269**	**1,386**	**2,658**	2,128	**825**	**152**	**1,151**
—	—	—	—	—	—	—	—	—	—	—	—	—
7	310	90	147	1	33	2	21	17	—	1	—	(1)
5,625	**9,375**	**578**	**1,735**	**48**	**2,681**	**271**	**1,387**	**2,675**	**2,128**	**826**	**152**	**1,150**
—	—	—	—	—	—	—	—	—	—	—	—	—
138	95	18	23	2	20	1	8	23	—	—	—	—
5,763	**9,470**	**596**	**1,758**	**50**	**2,702**	**272**	**1,395**	**2,699**	**2,128**	**826**	**152**	**1,150**
—	—	—	—	—	—	—	—	—	—	—	—	—
138	39	1	11	—	8	1	7	11	—	—	—	—
5,900	**9,509**	**596**	**1,769**	**50**	**2,709**	**273**	**1,402**	**2,710**	**2,128**	**826**	**152**	**1,150**
—	—	—	—	—	—	—	—	—	—	—	—	—
37	26	—	6	—	8	1	4	7	—	—	—	—
5,937	**9,535**	**596**	**1,774**	**50**	**2,717**	**273**	**1,407**	**2,717**	**2,128**	**826**	**152**	**1,150**
355	342	356	352	328	340	333	335	339	312	331	297	302
15.81	26.53	1.37	4.51	.14	7.79	.81	4.07	7.84	6.82	2.49	.51	3.81
355	342	354	351	327	341	335	336	339	312	331	297	301
15.84	**27.40**	**1.63**	**4.94**	**.15**	**7.86**	**.81**	**4.13**	**7.88**	**6.82**	**2.50**	**.51**	**3.81**
355	342	354	351	327	341	334	336	339	312	331	297	301
16.23	**27.67**	**1.68**	**5.00**	**.15**	**7.92**	**.81**	**4.15**	**7.95**	**6.82**	**2.50**	**.51**	**3.81**
355	342	354	351	327	341	334	336	339	312	331	297	301
16.62	**27.78**	**1.68**	**5.03**	**.15**	**7.94**	**.82**	**4.17**	**7.98**	**6.82**	**2.50**	**.51**	**3.81**
355	342	354	351	327	341	334	336	339	312	331	297	301
16.72	**27.86**	**1.68**	**5.05**	**.15**	**7.97**	**.82**	**4.18**	**8.00**	**6.82**	**2.50**	**.51**	**3.81**

Totals not adjusted for rounding differences



WOOD PULP BY GRADE

capacity/annual • year end • daily — for paper & paperboard

Practical Maximum Basis

Thousands short tons

			ALL GRADES WOOD PULP	WOOD PULP (exc. pulp for Construction Paper & Board)	DISSOL-VING		CHEMICAL PAPER GRADES				
							SULFITE			SULFATE	
											Bleac Semibl
			Total	Total	Total	Total	Total	Bleached	Unbleached	Total	Hardwood
ANNUAL CAPACITY 1986-1990	1986	Annual Capacity	60,686	59,750	1,399	47,655	1,703	1,502	201	45,952	11,402
		New Machines	206	206	—	64	—	—	—	64	29
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective		Net Improvements	823	858	(17)	748	(87)	(76)	(11)	835	385
	1987	**Annual Capacity**	**61,715**	**60,814**	**1,382**	**48,467**	**1,616**	**1,426**	**190**	**46,851**	**11,817**
		New Machines	156	156	—	43	—	—	—	43	21
		Net Improvements	859	859	13	799	(44)	(44)	—	843	221
	1988	**Annual Capacity**	**62,730**	**61,829**	**1,395**	**49,310**	**1,572**	**1,382**	**190**	**47,737**	**12,059**
		New Machines	587	587	—	452	—	—	—	452	339
		Net Improvements	634	634	—	551	—	—	—	551	145
	1989	**Annual Capacity**	**63,951**	**63,050**	**1,395**	**50,312**	**1,572**	**1,382**	**190**	**48,740**	**12,543**
		New Machines	886	886	—	514	—	—	—	514	162
		Net Improvements	472	472	1	409	—	—	—	409	62
	1990*	**Annual Capacity**	**65,309**	**64,408**	**1,396**	**51,236**	**1,572**	**1,382**	**190**	**49,663**	**12,767**
YEAR END CAPACITY 1986-1990	**1986**	**Year End Capacity**	61,005	60,104	**1,379**	**47,886**	**1,694**	**1,504**	**190**	**46,192**	**11,558**
		New Machines	211	211	—	2	—	—	—	2	—
		Net Improvements	938	938	9	936	(121)	(121)	—	1,058	316
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	**1987**	**Year End Capacity**	**62,153**	**61,252**	**1,388**	**48,824**	**1,572**	**1,382**	**190**	**47,251**	**11,874**
		New Machines	111	111	—	71	—	—	—	71	36
		Net Improvements	792	792	6	699	—	—	—	699	233
	1988	**Year End Capacity**	**63,056**	**62,155**	**1,394**	**49,594**	**1,572**	**1,382**	**190**	**48,022**	**12,143**
		New Machines	1,105	1,105	—	660	—	—	—	660	486
		Net Improvements	467	467	2	409	—	—	—	409	97
	1989	**Year End Capacity**	**64,629**	**63,728**	**1,396**	**50,663**	**1,572**	**1,382**	**190**	**49,091**	**12,727**
		New Machines	448	448	—	378	—	—	—	378	—
		Net Improvements	430	430	—	355	—	—	—	355	49
	1990*	**Year End Capacity**	**65,507**	**64,606**	**1,396**	**51,397**	**1,572**	**1,382**	**190**	**49,824**	**12,776**
YEAR END DAILY RATE 1986-1990	1986	Available Days	356	357	352	357	351	350	361	357	357
		Daily Rate	171.31	168.42	3.92	134.23	4.82	4.29	.53	129.41	32.33
	1987	Available Days	356	357	352	357	353	352	361	357	358
		Daily Rate	**174.49**	**171.60**	**3.95**	**136.82**	**4.46**	**3.93**	**.53**	**132.36**	**33.21**
	1988	Available Days	356	357	352	357	353	352	361	357	358
		Daily Rate	**177.01**	**174.12**	**3.96**	**138.97**	**4.46**	**3.93**	**.53**	**134.52**	**33.96**
	1989	Available Days	356	357	352	357	353	352	361	357	358
		Daily Rate	**181.42**	**178.53**	**3.97**	**141.97**	**4.46**	**3.93**	**.53**	**137.51**	**35.58**
	1990*	Available Days	356	357	352	357	353	352	361	357	358
		Daily Rate	**183.88**	**180.99**	**3.97**	**144.02**	**4.46**	**3.93**	**.53**	**139.56**	**35.72**

*Capacity additions presented here for 1990 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year

for construction paper & board

AND SODA		SEMICHEMICAL			MECHANICAL				SCREEN-INGS	WOOD PULP FOR CONSTRUCTION PAPER & BOARD		
hed & eached Softwood	Unbleached	Total	Bleached	Unbleached	Total	Stone Ground-wood	Refiner	Thermo-mechan-ical	Total	Total	Stone Ground-wood & Refiner	Defib-rated Exploded†
13,169	21,381	4,631	404	4,227	6,058	2,996	402	2,660	7	936	269	667
35	—	—	—	—	142	3	—	139	—	—	—	—
257	193	(5)	4	(8)	131	(46)	(4)	181	1	(35)	1	(36)
13,461	**21,574**	**4,627**	**408**	**4,219**	**6,331**	**2,953**	**399**	**2,980**	**7**	**901**	**271**	**630**
22	—	—	—	—	112	68	—	45	—	—	—	—
153	468	12	—	12	34	12	—	22	—	—	—	—
13,636	**22,042**	**4,639**	**408**	**4,231**	**6,478**	**3,033**	**399**	**3,047**	**7**	**901**	**271**	**630**
113	—	—	—	—	135	106	—	29	—	—	—	—
116	289	73	—	73	10	(26)	—	36	—	—	—	—
13,866	**22,331**	**4,712**	**408**	**4,304**	**6,623**	**3,113**	**399**	**3,112**	**7**	**901**	**271**	**630**
75	277	—	—	—	372	142	—	230	—	—	—	—
46	301	33	—	33	28	(4)	—	32	—	—	—	—
13,987	**22,909**	**4,746**	**408**	**4,338**	**7,023**	**3,251**	**399**	**3,374**	**7**	**901**	**271**	**630**
13,250	**21,384**	**4,628**	**408**	**4,220**	**6,203**	**2,980**	**399**	**2,825**	**7**	901	**271**	**630**
2	—	—	—	—	209	42	—	167	—	—	—	—
289	453	(11)	—	(11)	3	(32)	—	36	—	—	—	—
13,541	**21,836**	**4,618**	**408**	**4,210**	**6,416**	**2,989**	**399**	**3,028**	**7**	**901**	**271**	**630**
36	—	—	—	—	40	40	—	—	—	—	—	—
111	355	38	—	38	49	16	—	33	—	—	—	—
13,687	**22,191**	**4,655**	**408**	**4,249**	**6,504**	**3,045**	**399**	**3,061**	**7**	**901**	**271**	**630**
174	—	—	—	—	445	237	—	208	—	—	—	—
103	208	74	—	74	(17)	(34)	—	17	—	—	—	—
13,965	**22,399**	**4,730**	**408**	**4,322**	**6,932**	**3,248**	**399**	**3,286**	**7**	**901**	**271**	**630**
—	378	—	—	—	70	—	—	70	—	—	—	—
30	276	17	—	17	57	16	—	41	—	—	—	—
13,995	**23,053**	**4,747**	**408**	**4,339**	**7,059**	**3,264**	**399**	**3,397**	**7**	**901**	**271**	**630**
357	356	355	355	355	360	360	357	361	364	312	339	302
37.10	59.98	13.03	1.15	11.88	17.22	8.29	1.12	7.82	.02	2.89	.80	2.09
357	356	355	355	355	360	360	357	361	364	312	339	302
37.90	**61.26**	**13.01**	**1.15**	**11.86**	**17.81**	**8.31**	**1.12**	**8.38**	**.02**	**2.89**	**.80**	**2.09**
357	356	355	355	355	360	360	357	361	364	312	339	302
38.31	**62.25**	**13.11**	**1.15**	**11.96**	**18.06**	**8.47**	**1.12**	**8.47**	**.02**	**2.89**	**.80**	**2.09**
357	356	355	355	355	360	359	357	361	364	312	339	302
39.09	**62.84**	**13.32**	**1.15**	**12.17**	**19.26**	**9.04**	**1.12**	**9.11**	**.02**	**2.89**	**.80**	**2.09**
357	356	355	355	355	360	359	357	361	364	312	339	302
39.17	**64.67**	**13.37**	**1.15**	**12.22**	**19.61**	**9.08**	**1.12**	**9.42**	**.02**	**2.89**	**.80**	**2.09**

†Excludes the defibrated exploded pulp capacity of mills that produce hard pressed board

Totals not adjusted for rounding differences

ANNUAL CAPACITY/REGIONAL DISTRIBUTION

paper & paperboard

TOTAL U.S. CAPACITY		GRADES	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL	
1986	1990	*Practical Maximum Basis/Thousands short tons*	1986	1990	1986	1990	1986	1990
77,921	86,232	**TOTAL ALL GRADES PAPER & PAPERBOARD**	6,026	6,392	5,728	6,010	12,385	13,172
75,777	**84,104**	**TOTAL PAPER & PAPERBOARD**	**5,974**	**6,341**	**5,315**	**5,601**	**12,138**	**12,923**
38,014	**42,687**	**TOTAL PAPER**	**5,122**	**5,450**	**3,925**	**4,084**	**7,424**	**7,983**
5,804	6,636	NEWSPRINT	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
20,980	24,393	PRINTING, WRITING & RELATED	3,791	4,081	2,379	2,461	5,017	5,486
1,685	1,917	Uncoated Groundwood	706	653	N.A.	N.A.	304	351
3,799	4,509	Coated Groundwood	1,251	1,271	270	287	1,180	1,270
2,944	3,880	Coated Free Sheet	413	701	153	185	1,023	1,284
11,527	13,051	Uncoated Free Sheet	1,416	1,451	1,779	1,812	2,389	2,461
1,025	1,036	Solid Bleached Bristols	5	5	15	15	121	120
5,758	5,702	PACKAGING & INDUSTRIAL CONVERTING	491	510	318	313	845	866
5,472	5,955	TISSUE	524	527	1,019	1,086	1,401	1,454
37,763	**41,417**	**TOTAL PAPERBOARD**	**852**	**891**	**1,390**	**1,517**	**4,714**	**4,940**
18,622	21,088	UNBLEACHED KRAFT	—	—	—	—	—	—
17,175	19,195	of which Kraft Linerboard	—	—	—	—	—	—
4,576	4,866	SOLID BLEACHED	N.A.	N.A.	—	—	N.A.	N.A.
5,557	5,934	SEMICHEMICAL	N.A.	N.A.	—	—	1,768	1,949
9,008	9,529	RECYCLED	728	771	1,390	1,517	2,943	2,988
2,143	**2,128**	**TOTAL CONSTRUCTION PAPER & BOARD**	**51**	**51**	**413**	**408**	**247**	**249**

wood pulp

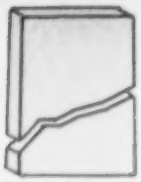
60,686	65,309	**TOTAL ALL GRADES WOOD PULP**	3,448	3,515	1,401	1,408	3,924	4,192
59,750	**64,408**	**TOTAL WOOD PULP (exc. pulp for Construction Paper & Board)**	**3,369**	**3,436**	**1,383**	**1,390**	**3,802**	**4,085**
1,399	1,396	DISSOLVING	—	—	—	—	—	—
1,703	1,572	SULFITE PAPER GRADES	N.A.	N.A.	N.A.	N.A.	469	346
45,952	49,663	SULFATE & SODA PAPER GRADES	2,043	2,118	503	504	1,553	1,824
13,169	13,987	Bleached & Semibleached Softwood	631	642	147	147	329	457
11,402	12,767	Bleached & Semibleached Hardwood	1,351	1,410	357	357	998	1,134
21,388	22,916	Unbleached	N.A.	N.A.	—	—	N.A.	N.A.
4,631	4,746	SEMICHEMICAL	N.A.	N.A.	450	453	1,356	1,417
6,058	7,023	MECHANICAL	1,044	1,047	187	189	424	498
936	**901**	**WOOD PULP FOR CONSTRUCTION PAPER & BOARD[3]**	**79**	**79**	**18**	**18**	**122**	**107**

(1) Includes cotton fiber and thin papers.
(2) Includes screenings.
(3) Excludes defibrated/exploded pulp capacity of mills that produce hard pressed board.
N.A.—Not Available

W. NO. CENTRAL		SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC*		LOCATION NOT DETERMINED	
1986	1990	1986	1990	1986	1990	1986	1990	1986	1990	1986	1990
1,715	**2,168**	**18,901**	**21,187**	**10,343**	**11,513**	**11,363**	**12,942**	**11,460**	**12,150**	—	699
1,546	**1,999**	**18,416**	**20,703**	**9,931**	**11,099**	**11,101**	**12,677**	**11,355**	**12,064**	—	**699**
1,053	**1,500**	**6,128**	**6,989**	**4,145**	**4,762**	**4,796**	**5,715**	**5,420**	**5,810**	—	**395**
—	—	1,049	1,275	1,060	1,338	1,157	1,220	1,852	2,069	—	—
1,038	1,484	2,706	3,308	2,311	2,604	1,878	2,672	1,860	1,902	—	395
N.A.	N.A.	N.A.	N.A.	140	143	N.A.	N.A.	198	217	—	—
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	95	98	—	—
N.A.	N.A.	N.A.	N.A.	353	394	N.A.	N.A.	162	163	—	—
242	209	1,658	2,048	1,569	1,803	1,142	1,521	1,330	1,352	—	395
—	—	379	406	N.A.	N.A.	356	346	75	71	—	—
N.A.	N.A.	1,880	1,664	172	180	1,210	1,270	826	884	—	—
—	—	494	742	602	639	551	553	882	955	—	—
493	**499**	**12,288**	**13,714**	**5,786**	**6,337**	**6,305**	**6,962**	**5,935**	**6,254**	—	**304**
—	—	8,034	8,904	3,713	4,172	3,752	4,325	3,124	3,383	—	304
—	—	7,551	8,438	3,283	3,691	3,258	3,717	3,083	3,350	—	—
—	—	1,914	2,160	761	803	1,371	1,362	507	523	—	—
N.A.	N.A.	1,123	1,237	898	951	789	850	803	769	—	—
421	425	1,218	1,413	414	411	394	425	1,500	1,578	—	—
169	**170**	**485**	**484**	**412**	**415**	**262**	**265**	**105**	**87**	—	—
690	**964**	**19,227**	**20,601**	**11,358**	**11,757**	**10,442**	**11,400**	**10,197**	**10,893**	—	577
641	**914**	**18,977**	**20,347**	**11,120**	**11,518**	**10,334**	**11,308**	**10,126**	**10,832**	—	**577**
—	—	529	513	N.A.	N.A.	—	—	651	665	—	—
—	—	—	—	—	—	—	—	791	792	—	—
322	332	16,795	17,965	9,255	9,514	8,761	9,578	6,719	7,252	—	577
N.A.	N.A.	4,473	4,794	2,406	2,422	2,305	2,359	2,793	2,932	—	150
N.A.	N.A.	3,251	3,826	3,177	3,307	1,879	2,155	162	193	—	150
N.A.	N.A.	9,077	9,353	3,672	3,785	4,577	5,064	3,764	4,127	—	277
N.A.	N.A.	802	867	692	659	629	669	577	553	—	—
273	537	845	995	954	1,128	944	1,061	1,388	1,569	—	—
49	**50**	**250**	**254**	**238**	**239**	**108**	**92**	**71**	**61**	—	—

Totals not adjusted for rounding differences

*Includes Alaska



WORLD CAPACITY

wood pulp (Except Defibrated Exploded & Screenings)

Thousands of METRIC tons

	TOTALS		Percent Increase	MECHANICAL		SEMICHEMICAL		CHEMICAL PAPER GRADES		
	1986	1990		1986	1990	1986	1990	1986	1990	of which 1986
WORLD TOTAL	160,369	174,191	**8.6**	37,647	42,883	9,696	9,989	107,030	114,978	29,316
DEVELOPED MARKET ECONOMIES	**129,296**	**139,855**	**8.2**	31,644	36,389	7,777	8,030	86,469	91,912	23,736
NORTH AMERICA	**78,234**	**83,863**	**7.2**	15,697	17,659	4,657	4,761	56,366	59,324	13,166
U.S.	**54,205**	**58,431**	**7.8**	5,496	6,371	4,201	4,306	43,239	46,488	6,015
Canada	**24,029**	**25,432**	**5.8**	10,201	11,288	456	455	13,127	13,436	7,151
JAPAN	**12,613**	**13,469**	**6.8**	2,636	2,922	1,330	1,330	8,302	8,892	953
WESTERN EUROPE	**33,866**	**37,754**	**11.5**	11,821	14,263	1,207	1,341	19,716	20,902	8,774
E.E.C.	**6,620**	**7,483**	**13.0**	3,292	3,807	404	448	2,743	3,046	967
Nordic countries	**21,555**	**24,185**	**12.2**	7,635	9,500	735	825	12,545	13,095	5,430
Rest of Western Europe	**5,691**	**6,086**	**6.9**	894	956	68	68	4,428	4,761	2,377
OCEANIA	**2,718**	**2,899**	**6.7**	1,120	1,175	419	434	1,169	1,278	453
OTHERS	**1,865**	**1,870**	**0.3**	370	370	164	164	916	916	390
DEVELOPING MARKET ECONOMIES	**9,941**	**12,368**	**24.4**	1,813	2,046	656	649	7,156	9,162	2,947
AFRICA	**853**	**1,007**	**18.1**	115	142	25	25	713	840	507
LATIN AMERICA	**6,604**	**8,386**	**27.0**	928	1,149	366	386	5,234	6,775	2,160
of which: Brazil	**4,148**	**5,341**	**28.8**	482	523	127	127	3,477	4,629	1,460
Mexico	**649**	**868**	**33.7**	145	295	—	—	504	573	—
ASIA	**2,484**	**2,975**	**19.8**	770	755	265	238	1,209	1,547	280
CENTRALLY PLANNED ECONOMIES	**21,132**	**21,968**	**4.0**	4,190	4,448	1,263	1,310	13,405	13,904	2,633
of which: USSR	**13,750**	**13,750**	—	2,500	2,500	850	850	8,700	8,700	2,000

Totals not adjusted for rounding differences. **No data available for 1990.*

STRUCTURE OF U.S. PAPER, PAPERBOARD, WOOD PULP INDUSTRY—

mill size

ANNUAL CAPACITY RANGE Thousands short tons	PAPER & PAPERBOARD		WOOD PULP	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL	**555**	**100%**	**219**	**100%**
0-25	143	2.4	15	0.4
26-50	91	4.3	17	1.1
51-75	70	5.6	17	1.8
76-100	42	4.9	12	1.6
101-125	27	4.0	13	2.5
126-150	26	4.6	7	1.6
151-175	14	3.1	13	3.6
176-200	20	4.9	10	3.2
201-250	25	7.3	19	7.0
251-300	16	5.7	13	5.9
301-350	13	5.6	11	6.1
351-400	10	4.9	14	8.9
401-450	17	9.5	10	7.2
451-500	10	6.2	13	10.4
over 500	31	27.0	35	38.5

Capacities measured on a practical maximum basis

capacity in integrated & nonintegrated

Thousands short tons

GRADES	ANNUAL CAPACITY		
	INTEGRATED TO WOOD PULP	NOT INTEGRATED TO WOOD PULP	TOTAL
TOTAL	**58,849**	**19,072**	**77,921**
PAPER	**28,594**	**9,420**	**38,014**
Newsprint	5,298	506	5,804
Uncoated Groundwood	1,359	326	1,685
Coated Groundwood	3,656	143	3,799
Coated Free Sheet	2,178	766	2,944
Uncoated Free Sheet*	8,510	2,705	11,215
Thin Papers	78	234	312
Solid Bleached Bristols	936	89	1,025
Pkg. & Ind. Conv.	4,355	1,403	5,758
Tissue	2,224	3,248	5,472
PAPERBOARD	**28,932**	**8,832**	**37,763**
Unbleached Kraft	18,622	—	18,622
Solid Bleached	4,574	2	4,576
Semichemical	5,454	104	5,557
Recycled	282	8,726	9,008
CONSTRUCTION PAPER & BOARD	**1,323**	**820**	**2,143**

**Includes cotton fiber* *Totals not adjusted for rounding differences*

Integrated mills include all mills with active on-site wood pulp capacity, whether or not this capacity provides a significant portion of total furnish.

paper & paperboard (Except Insulating & Hard Pressed Board)

market	DISSOLVING		TOTALS			NEWSPRINT		PRINTING & WRITING		WRAPPING		ALL OTHERS	
1989*	1986	1990	1986	1990	Percent Increase	1986	1990	1986	1990	1986	1990	1986	1990
29,995	5,996	6,341	**226,323**	**250,823**	**10.8**	32,181	35,112	60,000	70,296	109,083	118,134	25,059	27,281
24,211	3,406	3,524	**173,649**	**192,121**	**10.6**	26,744	29,159	48,536	57,296	78,831	84,717	19,538	20,949
13,644	1,514	1,519	**85,799**	**95,197**	**11.0**	15,150	16,220	21,259	25,667	40,551	43,920	8,539	9,391
6,388	1,269	1,266	**69,641**	**77,186**	**10.8**	5,265	6,020	18,750	21,849	37,273	40,414	8,353	8,903
7,256	245	253	**16,158**	**18,011**	**11.5**	9,885	10,200	2,509	3,818	3,278	3,506	498	487
921	345	325	**24,617**	**26,491**	**7.6**	2,835	3,068	6,646	7,352	11,001	11,611	4,135	4,460
8,746	1,122	1,248	**58,209**	**64,945**	**11.6**	7,608	8,480	19,908	23,468	24,570	26,351	6,123	6,646
1,086	181	182	**30,574**	**34,229**	**12.0**	2,158	2,460	11,298	13,318	13,347	14,328	3,771	4,123
5,040	640	765	**18,014**	**20,825**	**15.6**	4,565	5,070	5,795	7,230	6,385	7,100	1,269	1,425
2,620	301	301	**9,621**	**9,891**	**2.8**	885	950	2,815	2,920	4,838	4,923	1,083	1,098
510	10	12	**3,038**	**3,442**	**13.3**	705	945	353	437	1,717	1,802	263	258
390	415	420	**1,986**	**2,046**	**3.0**	446	446	370	372	992	1,033	178	195
3,168	316	511	**22,382**	**25,134**	**12.3**	2,496	2,788	5,515	6,161	12,037	13,579	2,334	2,606
507	—	—	**1,064**	**1,176**	**10.5**	112	131	350	392	538	588	64	65
2,381	76	76	**12,483**	**13,840**	**10.9**	1,207	1,241	2,801	3,077	6,614	7,435	1,802	2,087
1,518	62	62	**4,940**	**5,795**	**17.3**	244	244	1,362	1,559	2,753	3,242	581	750
—	—	—	**3,316**	**3,503**	**5.6**	430	430	559	569	1,757	1,945	570	559
280	240	435	**8,835**	**10,118**	**14.5**	1,178	1,418	2,365	2,693	4,856	5,557	436	450
2,616	2,274	2,306	**30,292**	**33,568**	**10.8**	2,941	3,165	5,949	6,839	18,215	19,838	3,187	3,326
2,000	1,700	1,700	**14,000**	**14,000**	—	1,950	1,950	1,700	1,700	9,465	9,465	885	885

Source: Food and Agriculture Organization of the United Nations; U.S. capacity-American Paper Institute.

1986

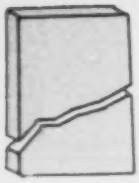
paper & paperboard mills

The degree of integration to wood pulp for each mill was calculated by dividing air-dry wood pulp capacity by paper & paperboard capacity.

DEGREE OF INTEGRATION TO WOOD PULP	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL		W. NO. CENTRAL	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL REGION	**81**	**100%**	**101**	**100%**	**132**	**100%**	**16**	**100%**
100% or more	8	20	3	6	3	3	1	8
80% to 99%	1	9	—	—	3	6	1	1
60% to 79%	3	16	4	10	8	16	3	18
40% to 59%	2	6	6	18	9	10	3	36
20% to 39%	2	8	1	3	5	9	—	—
01% to 19%	—	—	—	—	1	1	—	—
Not integrated	65	41	87	63	103	55	8	37

DEGREE OF INTEGRATION TO WOOD PULP	SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL REGION	**76**	**100%**	**44**	**100%**	**41**	**100%**	**84**	**100%**
100% or more	13	28	11	30	12	38	12	32
80% to 99%	20	50	10	51	11	47	9	29
60% to 79%	5	9	6	8	2	4	4	11
40% to 59%	3	1	1	2	—	—	2	5
20% to 39%	2	2	1	2	4	3	—	—
01% to 19%	1	1	—	—	1	1	1	2
Not integrated	32	9	15	7	11	7	36	21

All data based on machines in place January 1986



STRUCTURE OF U.S. PAPER & PAPERBOARD INDUSTRY

machines in operations 1986

size of machines—by principal grade produced

Machine Annual Capacity (Thousands Short Tons)	Paper: Newsprint Number of Machines	Newsprint Share of Total Capacity	Printing & Writing Number of Machines	Printing & Writing Share of Total Capacity	Packaging & Ind. Conv. Number of Machines	Packaging & Ind. Conv. Share of Total Capacity	Tissue Number of Machines	Tissue Share of Total Capacity
Total	42	100%	426	100%	178	100%	212	100%
0-5	—	—	40	1	35	2	22	2
6-10	—	—	35	1	43	6	29	4
11-15	—	—	27	2	24	6	29	7
16-20	—	—	34	3	15	5	22	7
21-30	—	—	64	8	21	10	33	15
31-40	2	1	44	7	6	4	32	21
41-50	1	1	40	9	2	2	26	21
51-75	5	6	52	15	6	6	14	15
76-100	2	3	35	15	7	11	5	8
101-125	4	8	19	10	8	16	—	—
126-150	14	33	11	7	4	9	—	—
151-200	7	21	20	17	6	18	—	—
201-250	6	23	5	5	—	—	—	—
251-300	1	4	—	—	1	5	—	—

All data based on machines in place January 1986

age of machines—by principal grade produced

Year Machine Installed Or Rebuilt*	Paper: Newsprint Number of Machines	Newsprint Share of Total Capacity	Printing & Writing Number of Machines	Printing & Writing Share of Total Capacity	Packaging & Ind. Conv. Number of Machines	Packaging & Ind. Conv. Share of Total Capacity	Tissue Number of Machines	Tissue Share of Total Capacity
Total	42		426		178		212	
No Data Available	3		63		23		45	
Total Sample	39	100%	363	100%	155	100%	167	100%
1985	1	3	22	5	7	2	6	5
1984	6	11	15	6	3	4	6	4
1983	3	5	13	4	11	7	5	4
1982	1	2	23	8	10	11	1	—
1981	3	11	16	6	6	10	8	7
1980	1	3	19	7	8	7	5	4
1979	5	17	9	3	2	1	5	5
1978	—	—	11	2	3	2	7	5
1977	1	1	14	5	3	2	5	4
1976	1	3	14	4	4	3	9	4
1971-1975	5	12	44	14	21	13	17	10
1966-1970	5	14	57	16	26	14	36	24
1961-1965	—	—	51	11	15	4	30	17
1956-1960	4	9	20	4	8	1	7	2
1951-1955	3	7	13	3	9	9	1	—
Prior to 1951	—	—	22	2	19	10	19	5

All data based on machines in place January 1986

age of machines—by geographic region

Year Machine Installed Or Rebuilt*	Total U.S. Number of Machines	Total U.S. Share of Total Capacity	New England Number of Machines	New England Share of Total Capacity	Mid-Atlantic Number of Machines	Mid-Atlantic Share of Total Capacity	E. No. Central Number of Machines	E. No. Central Share of Total Capacity
Total	1,246		217		208		315	
No Data Available	202		41		55		40	
Total Sample	1,044	100%	176	100%	153	100%	275	100%
1985	49	5	7	3	6	4	19	6
1984	32	4	3	2	2	1	10	6
1983	40	3	8	1	9	4	10	4
1982	53	7	18	13	5	2	9	6
1981	48	6	3	4	6	5	14	6
1980	47	6	9	6	4	4	12	6
1979	34	5	4	2	4	3	6	4
1978	35	4	5	4	4	1	7	4
1977	36	4	9	7	2	—	6	4
1976	37	3	7	5	3	2	13	3
1971-1975	147	16	18	15	21	21	41	17
1966-1970	180	16	34	18	33	25	48	16
1961-1965	110	8	18	9	22	13	25	6
1956-1960	62	6	7	2	13	8	14	3
1951-1955	39	3	9	6	3	2	11	2
Prior to 1951	95	4	17	3	16	5	30	7

All data based on machines in place January 1986

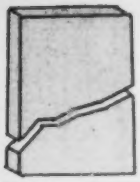
Machine Annual Capacity Thousands Short Tons	Paperboard: Unbleached Kraft		Solid Bleached		Semichemical		Recycled		Construction Grades: Construction	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	69	100%	26	100%	38	100%	186	100%	69	100%
0-5	—	—	—	—	—	—	5	—	9	1
6-10	—	—	—	—	—	—	1	—	10	3
11-15	—	—	—	—	—	—	13	2	7	4
16-20	—	—	—	—	—	—	13	3	5	4
21-30	—	—	—	—	—	—	33	9	12	14
31-40	—	—	—	—	1	1	25	10	5	8
41-50	—	—	1	1	—	—	28	14	6	12
51-75	2	1	1	1	5	6	41	28	6	17
76-100	2	1	1	2	3	5	14	13	7	26
101-125	1	—	—	—	11	23	7	9	1	5
126-150	2	1	1	3	6	15	2	3	1	6
151-200	12	11	17	63	6	20	2	4	—	—
201-250	14	17	3	15	3	13	2	5	—	—
251-300	7	11	1	6	1	5	—	—	—	—
301-400	23	43	—	—	2	12	—	—	—	—
over 400	6	15	1	9	—	—	—	—	—	—

Year Machine Installed Or Rebuilt*	Paperboard: Unbleached Kraft		Solid Bleached		Semichemical		Recycled		Construction Grades: Construction	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	69		26		38		186		69	
No Data Available	—		—		—		42		31	
Total Sample	69	100%	26	100%	38	100%	144	100%	38	100%
1985	3	5	—	—	2	4	6	6	—	—
1984	1	1	—	—	1	5	4	3	—	—
1983	1	1	—	—	—	—	7	5	1	—
1982	6	8	2	5	3	9	5	4	—	—
1981	4	6	—	—	1	6	8	6	—	—
1980	7	10	—	—	1	2	6	4	—	—
1979	5	5	3	12	1	1	4	4	—	—
1978	4	7	1	4	5	15	3	1	1	—
1977	3	3	1	4	1	3	6	7	2	8
1976	1	2	2	8	1	—	3	2	1	2
1971-1975	8	13	5	21	13	36	25	21	13	45
1966-1970	8	16	4	22	6	12	18	10	5	6
1961-1965	8	11	3	10	2	5	8	5	4	9
1956-1960	5	6	4	10	1	2	7	5	3	14
1951-1955	2	2	1	4	—	—	9	4	1	1
Prior to 1951	3	4	—	—	—	—	25	13	7	15

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

Year Machine Installed Or Rebuilt*	W. No. Central		South Atlantic		E. So. Central		W. So. Central		Mountain & Pacific	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	32		158		83		95		138	
No Data Available	4		26		12		8		16	
Total Sample	28	100%	132	100%	71	100%	87	100%	122	100%
1985	—	—	9	7	1	2	3	3	4	4
1984	—	—	6	5	1	1	4	2	6	6
1983	2	5	3	2	4	5	—	—	4	3
1982	1	12	6	4	4	10	5	8	5	7
1981	1	3	9	7	2	2	5	10	8	8
1980	2	4	6	5	6	10	2	3	6	8
1979	—	—	7	9	2	3	3	4	8	7
1978	1	3	9	9	1	1	3	3	5	3
1977	—	—	4	3	2	5	5	5	8	6
1976	2	5	4	4	1	1	1	1	6	4
1971-1975	4	18	21	13	13	16	15	21	14	15
1966-1970	4	16	17	11	10	20	19	25	15	8
1961-1965	7	19	7	5	8	8	6	6	17	13
1956-1960	1	4	11	8	8	9	5	5	3	2
1951-1955	2	7	3	2	3	4	4	2	4	3
Prior to 1951	1	4	10	6	5	3	7	2	9	3

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.



FIBER SOURCES for paper/paperboard/wood pulp manufacture

fiber consumption in paper & paperboard manufacture

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific	Location Not Determined
1986											
TOTAL FIBER	74,022	100.0	5,213	5,285	11,405	1,526	18,083	10,060	11,114	11,337	—
TOTAL WOOD PULP	55,582	75.1	3,881	2,941	6,092	955	15,012	8,850	9,557	8,293	—
Manufactured on-site	46,248	62.5	2,191	1,168	2,878	596	14,377	8,417	9,308	7,312	—
*Purchased & transferred	9,334	12.6	1,690	1,773	3,214	359	635	433	249	981	—
†TOTAL RECYCLABLE PAPER	18,128	24.5	1,238	2,314	5,259	551	3,017	1,187	1,519	3,041	—
Mixed Papers	2,045	2.8	175	369	545	111	355	196	122	171	—
Newspapers	3,118	4.2	146	641	727	60	479	80	136	849	—
Corrugated	8,634	11.7	356	650	2,337	321	1,781	754	734	1,701	—
Pulp Substitutes	2,761	3.7	426	385	784	48	387	147	317	267	—
High Grade Deinking	1,570	2.1	136	268	867	11	15	11	210	53	—
OTHER FIBERS	313	0.4	94	29	54	21	52	23	38	2	—
1987											
TOTAL FIBER	77,616	100.0	5,452	5,452	11,856	1,583	19,420	10,542	11,663	11,647	—
TOTAL WOOD PULP	58,090	74.8	4,036	2,990	6,313	992	16,069	9,251	9,969	8,471	—
Manufactured on-site	48,585	62.6	2,330	1,187	2,978	621	15,438	8,829	9,721	7,482	—
*Purchased & transferred	9,505	12.2	1,706	1,803	3,335	371	631	422	248	989	—
†TOTAL RECYCLABLE PAPER	19,206	24.8	1,322	2,430	5,489	571	3,295	1,269	1,656	3,174	—
Mixed Papers	2,096	2.7	180	381	556	113	375	205	115	170	—
Newspapers	3,241	4.2	151	679	785	60	494	86	140	846	—
Corrugated	9,214	11.9	360	681	2,426	330	1,986	776	815	1,840	—
Pulp Substitutes	2,926	3.8	485	419	821	57	388	181	308	267	—
High Grade Deinking	1,729	2.2	146	269	901	11	52	21	279	50	—
OTHER FIBERS	319	0.4	95	33	53	21	56	22	38	3	—
1988											
TOTAL FIBER	79,836	100.0	5,666	5,619	12,215	1,703	20,052	10,623	11,970	11,951	38
TOTAL WOOD PULP	59,451	74.5	4,215	3,026	6,482	1,111	16,485	9,272	10,131	8,690	38
Manufactured on-site	49,815	62.4	2,440	1,194	3,028	719	15,927	8,858	9,898	7,713	38
*Purchased & transferred	9,636	12.1	1,775	1,832	3,454	392	558	414	233	978	—
†TOTAL RECYCLABLE PAPER	20,050	25.1	1,342	2,559	5,678	571	3,510	1,329	1,802	3,258	—
Mixed Papers	2,150	2.7	182	410	561	114	384	207	111	180	—
Newspapers	3,323	4.2	156	690	830	61	508	87	141	849	—
Corrugated	9,764	12.2	367	746	2,514	334	2,116	819	961	1,907	—
Pulp Substitutes	3,012	3.8	491	441	835	51	429	189	310	266	—
High Grade Deinking	1,800	2.2	146	272	937	11	73	27	279	55	—
OTHER FIBERS	336	0.4	109	33	54	21	56	22	38	3	—
1989											
TOTAL FIBER	82,709	100.0	5,770	5,767	12,600	1,761	20,650	11,236	12,467	12,223	235
TOTAL WOOD PULP	61,352	74.2	4,259	3,057	6,756	1,165	16,904	9,601	10,510	8,866	235
Manufactured on-site	51,368	62.1	2,450	1,197	3,092	764	16,309	9,162	10,277	7,884	235
*Purchased & transferred	9,984	12.1	1,809	1,860	3,664	401	595	439	233	983	—
†TOTAL RECYCLABLE PAPER	21,000	25.4	1,401	2,674	5,788	575	3,688	1,613	1,906	3,354	—
Mixed Papers	2,236	2.7	192	439	581	116	399	212	114	184	—
Newspapers	3,420	4.1	160	714	849	62	536	90	148	862	—
Corrugated	10,322	12.5	379	785	2,542	335	2,189	1,088	1,024	1,978	—
Pulp Substitutes	3,163	3.8	522	463	860	52	465	196	333	273	—
High Grade Deinking	1,859	2.2	148	273	957	11	99	27	287	57	—
OTHER FIBERS	357	0.4	110	36	56	21	58	22	51	3	—

Comprises all dried, wet lap or slush pulp not produced on-site including transfers from company owned or affiliated mills.

†Includes construction grades and molded pulp products.

fiber consumption in paper & paperboard manufacture (Continued)

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific	Location Not Determined
1990											
TOTAL FIBER	**84,632**	100.0	5,818	5,785	12,759	1,901	21,215	11,658	12,795	12,305	398
TOTAL WOOD PULP	62,756	74.2	4,270	3,064	6,850	1,303	17,257	9,941	10,757	8,917	398
Manufactured on-site	52,522	62.1	2,452	1,198	3,128	840	16,636	9,402	10,523	7,945	398
*Purchased & transferred	10,234	12.1	1,818	1,866	3,722	463	621	539	234	972	—
†TOTAL RECYCLABLE PAPER	21,518	25.4	1,437	2,685	5,852	577	3,900	1,695	1,987	3,385	—
Mixed Papers	2,335	2.8	197	441	589	116	402	213	115	262	—
Newspapers	3,621	4.3	170	720	865	62	751	91	149	813	—
Corrugated	10,514	12.4	387	787	2,562	335	2,205	1,160	1,098	1,980	—
Pulp Substitutes	3,178	3.7	535	465	872	54	442	203	334	273	—
High Grade Deinking	1,869	2.2	148	273	965	11	99	27	291	57	—
OTHER FIBERS	360	0.4	111	36	57	21	58	22	52	3	—

Totals not adjusted for rounding differences.

pulpwood consumption in wood pulp manufacture

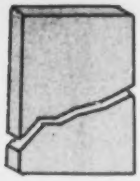
Thousands of CORDS

1986											
TOTAL PULPWOOD	**86,859**	**100.0**	**5,123**	**1,977**	**5,105**	**973**	**27,191**	**15,849**	**14,835**	**16,006**	**—**
Roundwood & Roundwood Chips	51,906	59.8	4,158	1,676	3,809	883	18,384	10,956	9,253	2,808	—
Forest Residues	3,839	4.4	—	60	608	36	1,107	328	1,303	397	—
Manufacturing Residues	31,113	35.8	965	242	687	54	7,720	4,365	4,279	12,801	—
1987											
TOTAL PULPWOOD	**90,704**	100.0	5,238	2,038	5,201	991	28,564	16,454	15,576	16,643	—
Roundwood & Roundwood Chips	54,792	60.4	4,267	1,743	3,874	897	19,589	11,603	9,818	3,000	
Forest Residues	3,981	4.4	—	58	635	38	1,135	320	1,356	439	—
Manufacturing Residues	31,931	35.2	971	237	692	56	7,839	4,531	4,401	13,203	—
1988											
TOTAL PULPWOOD	**92,725**	**100.0**	**5,335**	**2,056**	**5,245**	**1,073**	**29,411**	**16,528**	**15,852**	**17,163**	**60**
Roundwood & Roundwood Chips	55,927	60.3	4,338	1,755	3,847	979	20,230	11,674	9,951	3,094	60
Forest Residues	3,986	4.3	—	60	647	38	1,115	320	1,360	446	—
Manufacturing Residues	32,811	35.4	997	243	751	56	8,067	4,534	4,541	13,623	—
1989											
TOTAL PULPWOOD	**94,921**	100.0	5,372	2,067	5,537	1,097	29,873	16,928	16,297	17,599	150
Roundwood & Roundwood Chips	57,221	60.3	4,372	1,762	4,113	1,003	20,474	11,946	10,281	3,119	150
Forest Residues	4,014	4.2	—	61	668	38	1,163	325	1,363	397	—
Manufacturing Residues	33,686	35.5	1,001	244	756	56	8,236	4,657	4,653	14,083	—
1990											
TOTAL PULPWOOD	**96,744**	**100.0**	**5,368**	**2,068**	**5,571**	**1,161**	**30,360**	**17,233**	**16,796**	**17,893**	**255**
Roundwood & Roundwood Chips	58,628	60.6	4,387	1,763	4,140	1,087	20,874	12,220	10,710	3,192	255
Forest Residues	4,074	4.2	—	61	669	38	1,190	326	1,379	412	—
Manufacturing Residues	34,042	35.2	1,001	244	762	56	8,296	4,687	4,706	14,289	—

Totals not adjusted for rounding differences.

FIBER CONSUMPTION DEFINITIONS

1986—Actual consumption
1987—Best estimate based on year-to-date experience
1988-1990—Consumption at capacity levels of production



RECYCLABLE PAPER CONSUMED IN PAPER & PAPERBOARD MANUFACTURE

actual consumption

Thousands short tons

END PRODUCTS	1986 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
	18,128	2,045	3,118	8,634	2,761	1,570
TOTAL PAPER	**5,142**	**122**	**1,566**	**308**	**1,749**	**1,396**
NEWSPRINT	1,365	—	1,364	—	1	—
PRINTING, WRITING & RELATED	1,257	—	—	4	910	342
PACKAGING & IND. CONVERTING	331	25	10	107	183	5
TISSUE	2,189	97	191	197	655	1,049
TOTAL PAPERBOARD	**12,094**	**1,575**	**1,293**	**8,099**	**956**	**172**
KRAFT, BLEACHED & UNBLEACHED	1,684	—	—	1,561	112	10
SEMICHEMICAL	1,704	50	—	1,607	48	—
RECYCLED	8,706	1,525	1,293	4,931	796	162
CONSTRUCTION PAPER & BOARD	**892**	**348**	**259**	**227**	**57**	**1**

Data on recyclable paper are collected in an industry-wide survey of paper and paperboard mills under the following definitions.

1986—Actual consumption

1987—Best estimate based on year-to-date experience

1988-1990—Consumption at capacity levels of production

planned future consumption

Thousands short tons

END PRODUCTS	1987 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1988 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	19,206	2,096	3,241	9,214	2,926	1,729	20,050	2,150	3,323	9,764	3,012	1,800
TOTAL PAPER	**5,435**	**115**	**1,610**	**338**	**1,890**	**1,482**	**5,637**	**118**	**1,660**	**365**	**1,949**	**1,544**
NEWSPRINT	1,371	—	1,371	—	—	—	1,411	—	1,411	—	—	—
PRINTING, WRITING & RELATED	1,375	—	—	10	1,014	351	1,429	—	—	15	1,028	385
PACKAGING & IND. CONVERTING	337	18	14	129	171	5	368	13	16	136	197	5
TISSUE	2,352	97	225	199	705	1,126	2,429	105	233	214	724	1,154
TOTAL PAPERBOARD	**12,861**	**1,629**	**1,365**	**8,643**	**980**	**245**	**13,481**	**1,676**	**1,390**	**9,161**	**999**	**254**
KRAFT, BLEACHED & UNBLEACHED	1,913	—	—	1,744	99	71	2,153	—	—	1,974	102	77
SEMICHEMICAL	1,754	51	—	1,654	49	—	1,842	51	—	1,745	46	—
RECYCLED	9,194	1,578	1,365	5,245	832	174	9,486	1,625	1,390	5,442	852	177
CONSTRUCTION PAPER & BOARD	**910**	**352**	**267**	**233**	**57**	**1**	**932**	**357**	**273**	**238**	**65**	**1**

END PRODUCTS	1989 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1990 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	21,000	2,236	3,420	10,322	3,163	1,859	21,518	2,335	3,621	10,514	3,178	1,869
TOTAL PAPER	**5,832**	**119**	**1,698**	**391**	**2,023**	**1,601**	**6,095**	**195**	**1,863**	**406**	**2,019**	**1,612**
NEWSPRINT	1,430	—	1,430	—	—	—	1,671	77	1,594	—	—	—
PRINTING, WRITING & RELATED	1,470	—	—	17	1,056	397	1,483	—	—	17	1,066	400
PACKAGING & IND. CONVERTING	375	13	20	151	186	5	367	13	21	166	162	5
TISSUE	2,557	106	248	223	781	1,199	2,574	105	248	222	791	1,207
TOTAL PAPERBOARD	**14,206**	**1,749**	**1,439**	**9,687**	**1,075**	**256**	**14,457**	**1,770**	**1,473**	**9,865**	**1,094**	**256**
KRAFT, BLEACHED & UNBLEACHED	2,548	—	—	2,335	136	77	2,676	—	—	2,461	138	77
SEMICHEMICAL	1,860	51	—	1,762	47	—	1,877	51	—	1,778	48	—
RECYCLED	9,797	1,698	1,439	5,590	892	178	9,904	1,719	1,473	5,626	908	179
CONSTRUCTION PAPER & BOARD	**963**	**368**	**284**	**244**	**65**	**1**	**967**	**370**	**286**	**244**	**65**	**1**

Totals not adjusted for rounding differences.

Recyclable paper for molded pulp included under Construction Paper & Board as follows: 1986, 193,000 tons; 1987, 204,000 tons, 1988-90, 220,000 tons.

ANNOUNCED CAPACITY EXPANSION NEW MILLS & MACHINES

projects included in survey estimates

Thousands short tons

Grade	Annual Capacity	Proposed Start-up	Company & Location
Newsprint	224†	1989	Newsprint South Inc. Grenada, MS
Newsprint	175†	1989	Ponderay Newsprint Co. Usk, WA
Newsprint	230	1990	Southeast Paper Mfg. Co. Dublin, GA
Coated Groundwood	200*	1989	Blandin Paper Company Grand Rapids, MN
Coated Groundwood	200	1986	Bowater Incorporated Catawba, SC
Coated Groundwood	180	1986	Consolidated Papers Inc. Wisconsin Rapids, WI
Coated Free Sheet	210*	1988	Midtec Paper Corp. Kimberly, WI
Coated Free Sheet	N.A.*	1988	Potlatch Corporation Cloquet, MN
Coated Free Sheet	215	1986	Scott Paper Company Skowhegan, ME
Uncoated Groundwood	230†	1987	Lake Superior Paper Ind. Inc. Duluth, MN
Uncoated Free Sheet	230	1986	Georgia-Pacific Corp. Port Hudson, LA
Uncoated Free Sheet	290	1988/1989	Georgia-Pacific Corp. Port Hudson, LA
Uncoated Free Sheet	185	1986	Hammermill Paper Division of International Paper Co. Selma, AL
Uncoated Free Sheet	200 net	1989	International Paper Co. South U.S.
Uncoated Free Sheet/Cotton Fiber	30*	1986	Kimberly-Clark Corporation Whiting, WI
Tissue	N.A.†	1987&1988	Fort Howard Paper Co. Rincon, GA
Tissue	70	1986	James River Corp. Naheola, AL
Tissue	70	1988	James River Corp. Wauna, OR
Unbleached Kraft Linerboard	350	1990	Gaylord Container Corp. Bogalusa, LA
Unbleached Kraft Folding	420	1990	Mead Corporation N.A.
Solid Bleached Paperboard	250*	1986	Westvaco Corporation Covington, VA

** Will replace unspecified existing capacity. N.A.—Not Available. † New mill.*

Expansion projects include new paper, paperboard and wood pulp mills and new paper and paperboard machines in existing mills. These projects have been publicly announced by the managements of the companies concerned and are included in the capacity estimates reported in this survey. Survey estimates also include confirmed expansion projects that have not been publicly announced which, in keeping with the confidential nature of the survey, are not included in this listing.

DEFINITIONS AND GRADE DESCRIPTIONS

PRACTICAL MAXIMUM CAPACITY: Practical Maximum Capacity, as defined in this survey, is the tonnage of paper, paperboard or pulp of normal commercial quality that could be produced with full use of equipment and adequate supplies of raw materials and labor, and assuming full demand. No allowance is made for losses due to unscheduled shutdowns, strikes, temporary lack of power, etc., which cause decreases in actual production, but not in productive capacity. Capacity of paper machines which produce more than one grade is apportioned in accordance with actual production patterns or plans for future operation.

Capacity is reported in short tons of net finished paper and paperboard and air-dry (10% moisture content) pulp. Shrinkage of bleached or semibleached pulp is taken into account.

Annual practical maximum capacity—includes changes in capacity only for the portion of the year in which they are actually effective.

Year-end practical maximum capacity—assumes that all changes in capacity are in effect from the first day of the year in which they occur.

NEW MACHINES AND NET IMPROVEMENTS: Capacity increases or decreases are shown in two main groups: New Machines and Net Improvements.

New Machines—are defined as machines purchased or to be purchased from equipment manufacturers. Consequently, capacity changes resulting from transfers of paper machines from one mill to another are shown under Net Improvements.

Net Improvements—are defined as net changes resulting from modernization of machines, dismantling old machines, shifts in grades, etc.

Capacity increases from new machines are shown under New Machines for the first two years of operation (including the year of installation). Any additional capacity realized in a third or subsequent year is shown under Net Improvements.

MARKET PULP CAPACITY: Market pulp in this survey is defined as wood pulp produced in the U.S. for sale to pulp consumers. It excludes pulp for use or consumption by a producing mill or for shipment by a producing mill to other mills within its supply region which it owns, controls or with which it is affiliated. Shipments to owned mills outside the U.S. are defined as market pulp.

▶PAPER GRADES

NEWSPRINT: Paper used chiefly in the printing of newspapers, made largely from mechanical pulp and weighing not less than 28½ pounds nor more than 35 pounds (24 x 36 – 500).

UNCOATED GROUNDWOOD: Uncoated papers containing more than 10% groundwood or other mechanical pulps in their furnish, excluding newsprint.

MACHINE AND OFF MACHINE COATED: Bleached papers with a coating weight of at least 2½ pounds (25 x 38 – 500) on either side and at least 50% of the coating consisting of clay (Kaolin).

Coated Groundwood: Coated papers containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner) in their furnish.

Coated Free Sheet: Coated papers containing 10% or less mechanical pulp (mostly stone groundwood and/or refiner in their furnish).

UNCOATED FREE SHEET: Bleached uncoated printing and writing papers containing not more than 10% groundwood or other mechanical pulps in their furnish; i.e., offset, tablet, envelope, business papers (bond, ledger, mimeo, duplicator) form bond, cover and text and related papers.

BLEACHED BRISTOLS: Includes tabulating index, tag and file folder, coated cover bristols, and uncoated bristols (index, printing, and postcard).

COTTON FIBER: Papers containing 25% or more in their furnish of cotton, cotton rags, cotton waste, linters, linter pulp, flax, or similar fibers.

THIN PAPERS: Includes carbonizing, condenser, cigarette, bible, and similar papers.

PACKAGING AND INDUSTRIAL CONVERTING: Wrapping paper, shipping sack, bag and sack other than shipping sack, and other converting papers—18 pounds and over.

Unbleached Kraft: Paper containing more than 80% unbleached sulfate wood pulp. Wrapping paper, shipping sack, grocers sack and other bag, and other converting papers—18 lbs. and over (24 x 36 – 500).

Bleached Packaging and Industrial Converting: Paper made for similar end uses as unbleached kraft, but made from bleached, and semibleached sulfate and unbleached sulfite pulps. Wrapping paper, shipping sack, grocers and other bag and sack, and other converting papers—18 lbs. and over (24 x 36 – 500).

Specialty Packaging: Paper and board of all weights and furnishes, usually used as protective packaging for food and other consumer products, such as bakery bags, fast food and frozen food wraps. Also includes glassine, greaseproof and vegetable parchment paper.

Special Industrial: Paper and board, of all weights, calipers and furnishes, designed for specialized end uses and manufactured to exact customer specifications; includes abrasive paper, electrical insulation, filter paper and similar grades. Does not include wet machine board.

TISSUE: Includes sanitary grades: i.e., toilet, facial, napkin, toweling, sanitary napkin, wiper and special sanitary papers, and waxing, wrapping, wadding and miscellaneous grades.

▶PAPERBOARD GRADES

UNBLEACHED KRAFT PAPERBOARD: Paperboard made from a furnish containing not less than 80% wood pulp produced by the kraft sulfate process.

Linerboard: Unbleached kraft paperboard manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes. Includes solid unbleached kraft linerboard, both Fourdrinier and Cylinder, mottled white linerboard and clay coated unbleached kraft linerboard.

Folding: Paperboard manufactured, such as clay coated unbleached kraft and bleached lined unbleached kraft backed, for conversion into folding cartons and beverage carriers.

Other: All unbleached kraft paperboard whose end use is not otherwise classified, such as board for a filler for solid fiber board to be fabricated into a shipping container, tube, can, drum, file folder, tag, automotive panel, etc.

SOLID BLEACHED PACKAGING PAPERBOARD: Paperboard made for use in packaging from a furnish containing not less than 80% virgin bleached wood pulp. Bleached bristols not manufactured for packaging are included in the proper bleached bristol classification under papers.

Linerboard: Solid bleached paperboard, either Fourdrinier or Cylinder, manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Folding: Solid bleached paperboard for conversion into folding cartons, such as folding cartons for ice cream, butter, oleomargarine, frozen foods, bakery products, cosmetics, drugs, etc.

Milk Carton and Food Service: Solid bleached paperboard for conversion into milk carton, heavyweight cup, and round nested food container, plate, dish and tray, and for packaging for moist, liquid and oily foods.

Other: Solid bleached paperboard for conversion into packaging of blister pack, tubes and other products not classified above and for industrial products not classified under bleached bristols.

SEMICHEMICAL PAPERBOARD: Paperboard made from a furnish containing not less than 75% virgin wood pulp, the predominant portion of which is produced by a semichemical process.

RECYCLED PAPERBOARD: Paperboard manufactured from a combination of recycled fibers from various grades of paper stock with the predominant portion of its furnish being recycled fibers: sometimes including a very minor portion of virgin fibers.

Linerboard: Recycled paperboard produced from a furnish containing less than 80% virgin kraft wood pulp and used as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Corrugating Medium: Recycled paperboard produced from a furnish containing less than 75% virgin wood pulp and used as the fluting material when combining paperboard for conversion into corrugated boxes.

Container Chip and Filler Board: Recycled paperboard manufactured as a filler for solid fiber board for conversion into solid fiber boxes and other container chipboard (all chipboard under 26 pounds per 1000 sq. ft. manufactured for use as facing corrugated, solid fiber and single faced products which are used for interior packing, e.g., pads, partitions, dividers, layers and cushioning).

Folding: Recycled paperboard manufactured with bending quality for conversion into folding cartons (including unlined chipboard, kraft lined, white lined and clay coated).

Set-up: Recycled paperboard manufactured with non-bending specifications for conversion into rigid or set-up boxes (including plain chipboard, newslined, white vat lined).

Gypsum Wallboard Facing: Recycled paperboard manufactured for use as liner or facing on gypsum board, plasterboard (includes white, cream, gray, blue and all colors).

Other: Recycled paperboard with the same characteristics as paperboard for bending packaging or non-bending packaging but for non-packaging uses; plus recycled paperboard for end uses not otherwise classified, such as tag, file folder, tube, can, drum, match stem, tablet backs, toys, etc.

▶CONSTRUCTION PAPER & BOARD & OTHER

CONSTRUCTION PAPER: Sheathing paper, felts (roofing felts, floor covering, automotive felts, deadening, industrial, pipe covering, refrigerator), asbestos paper and asbestos filled paper, flexible wood fiber insulation.

WET MACHINE BOARD: Binders board, shoe board (e.g., counter board, heel board, innersole, etc.) automotive board, chair seat backing, coaster board, luggage, mill board, panel board, table top board, etc.

INSULATING BOARD: A fibrous-felted homogenous panel made by interfelting of the fibers (e.g.,interior building board, wallboard, sound deadening board, acoustical tile, exterior sheathing board, roof insulation board, trailer board, etc.).

▶WOOD PULP

DISSOLVING & SPECIAL ALPHA: Highly refined bleached white sulfite or sulfate pulp with a high content of alpha (pure cellulose) fiber.

SULFITE PAPER GRADES: Paper grade pulps produced by the sulfite process. Bleached pulp must achieve a G.E. Brightness of more than 75.

SULFATE & SODA PAPER GRADES: Paper grade pulps produced by the sulfate or soda process. Bleached pulp must achieve a G.E. Brightness of more than 75. Semibleached pulp must achieve a G.E. Brightness of not less than 45 or more than 75.

SEMICHEMICAL: High yield pulps produced with the use of some chemical agent such as neutral sulfite (N.S.S.C.); alkaline cook; chemipulp (defibrated pulp put through reaction chambers); chemi-mechanical pulp with a yield usually above 60%.

MECHANICAL: Fine textured, usually bright pulps, used in paper and paperboard manufacture and produced by mechanical rather than chemical processes.

Stone Groundwood: Pulp produced by grinding wood logs or bolts (usually 4 ft. in length) into relatively short fibers.

Refiner: Pulp produced by subjecting wood chips and/or residues to atmospheric or open discharge refining.

Thermomechanical: A high-yield pulp produced by a thermomechanical process in which wood particles are softened by pre-heating under pressure prior to a pressurized primary refining stage. Usually replaces or reduces the chemical pulp component in newsprint or groundwood papers.

▶WOOD PULP FOR CONSTRUCTION PAPER & PAPERBOARD

Coarse, often brown, pulps used in the manufacture of insulating board and construction paper. Also includes similar pulps if used in the manufacture of wet machine board. Excludes pulp for hard pressed board.

Stone Groundwood and Refiner: Pulps produced by the stone groundwood or refiner processes but used in the manufacture of construction paper and board.

Defibrated/Exploded: Pulps produced by subjecting wood chips to preheating and pressurized refining. Similar to the thermomechanical process except that operating variables produce an economical, coarse brown pulp suitable only for construction paper and board.

Screenings: Rejects and off-quality screenings from all grades of wood pulp except dissolving.

▶FIBERS

Roundwood: Comprises roundwood bolts and logs (4 feet or longer, including tree lengths) brought to the pulpmill for chipping, or chips made from primary roundwood bolts and logs at a chipmill, remote from the pulpmill.

Forest Residues: All logging residues such as portions of bolts or logs less than the minimum diameter specified by the consuming mill and poles, saplings, slash, limbs, twigs, or portions of bolts or logs not regarded as merchantable in normal pulpwood or sawlog operations. May also include merchantable portions of trees that will not be used for higher value products. Chips made from forest residues.

Manufacturing Residues: All mill residues such as slabs, edgings, trimmings, cores, planer shavings, sawdust or other wood residues of a wood manufacturing process and chips made from these residues.

Other Fibers: Cotton linters, cotton linter pulp, textile mill waste and cuttings, rags, waste rope and cordage, bagasse, flax, straw, jute, esparto, kenaf and all other vegetable fibers used in paper and paperboard manufacture.

▶RECYCLABLE PAPER

Mixed Papers: Number 1 and 2 mixed papers, super mixed papers, boxboard cuttings, mill wrappers.

Newspapers: Number 1 news, overissue news, super news. Any grade to be used as a news substitute.

Corrugated: Old containers both corrugated and solid fiber, container plant cuttings.

Pulp Substitutes & High Grade Deinking: Includes ledger, tabulating cards, bleached sulfate shavings (unless used as a news substitute). Envelope and bleached sulfite and sulfate cuttings, coated book stock, news and publication blanks, kraft paper and bags and all other grades not classified above.

Print free grades are reported as *Pulp Substitutes* and printed grades, if deinked, are reported as *High Grade Deinking*.

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